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MARCH 1969

RESOURCE MANAGEMENT REPORT

ONTARIO

DEPARTMENT OF LANDS AND FORESTS

HON. RENE BRUNELLE
Minister

G.H.U. BAYLY
Deputy Minister

No. 99 MARCH 1969

RESOURCE MANAGEMENT REPORT

FISH AND WILDLIFE BRANCH

ONTARIO

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No. 99 March, 1969

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MANITOULIN ISLAND DEER HUNT 1968

by
G.E. Thompson

F O R W A R D

The Manitoulin Island Deer Hunt Report will be presented in two parts: Part I will deal with statistics collected at the Little Current Checking Station, and Part II will deal with the special enforcement effort and publicity campaign and the implications of same on the Island.

DISCUSSION

PART I

On November 16th, 1968, the Little Current Checking Station came into operation on an "around the clock" basis. The station was dismantled on December 1st, 1968 after the deer season had concluded. All statistics collected during the 13-day hunt are presented in Tables I, II and III. An overall picture is presented in Table IV.

Hunter Success rate showed another decrease in 1968. The 1968 success of 23.0% is the lowest success rate since 1961 when the use of dogs was disallowed. At a casual first glance, possible reason(s) for this decrease could be attributed to:

1. Increased posting of land.

2. Severe weather conditions during the hunt.

3. Later deer season than the North Shore.

4. Extensive radio, T.V., and newspaper coverage prior to the deer season warning hunters that hunting on Manitoulin was by permission of the land-owners and that trespassers would be prosecuted.

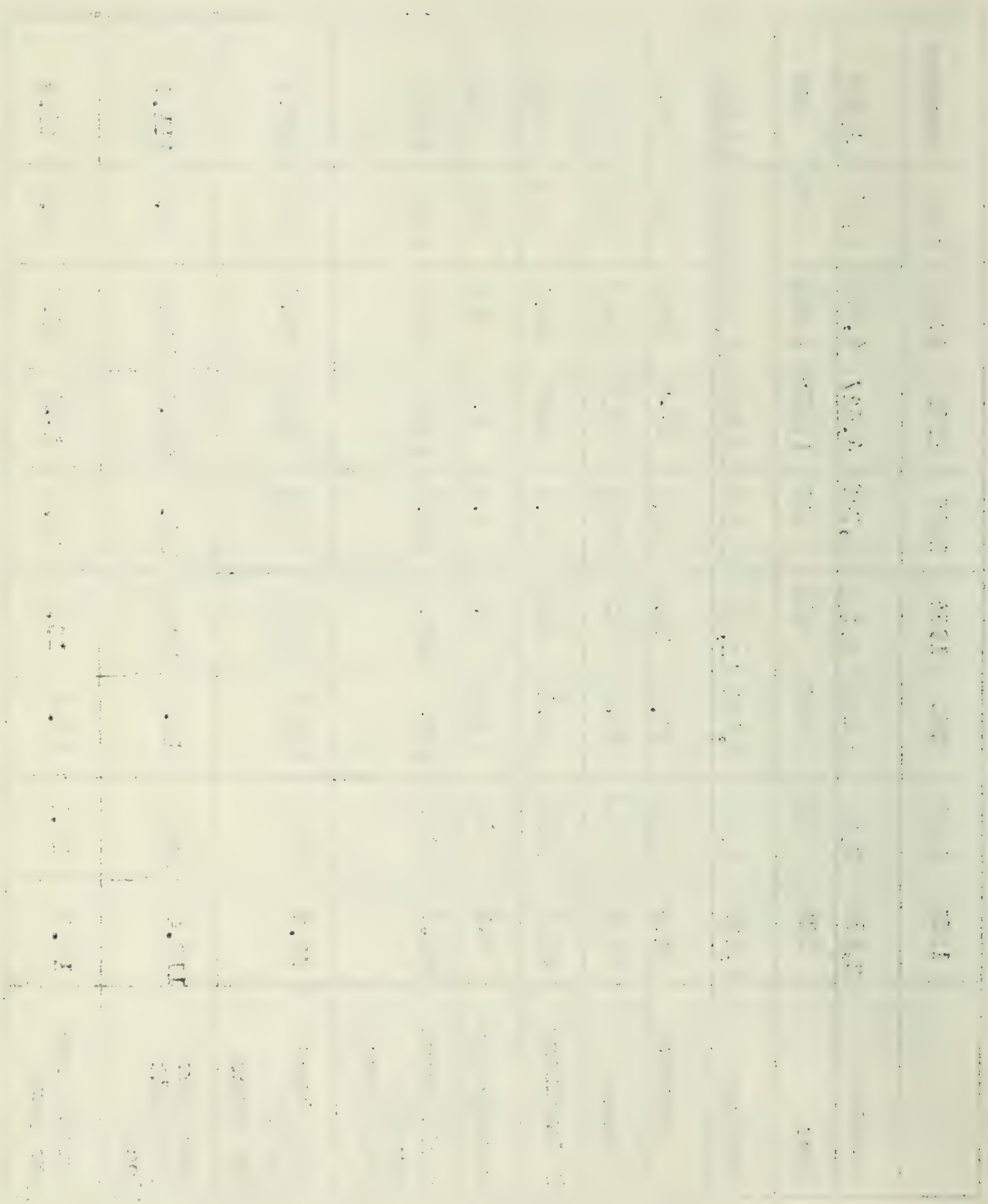
5. Later deer season resulted in deer being concentrated in specific areas, i.e., deer had already started to congregate in deer yarding areas.

Further, a point by point discussion of the above will help to clarify a few points:

TABLE IV

MANITOULIN ISLAND DEER HUNT SUMMARY

	1961	1962	1963	1964	1965	1966	1967	1968	Average
Hunters	2,476	2,408	2,402	3,168	3,248	4,027	4,415	3,745	3,239
Deer	524	610	692	931	937	1,177	1,149	860	860
Man-Days	9,429	8,607	9,421	12,990	13,529	15,411	17,846	15,918	12,906
% Success	21.2	25.4	28.8	29.2	28.9	29.0	26.0	23.0	26.4
% Fawns	31.2	35.2	29.0	34.0	28.2	33.9	34.3	28.5	31.9
% Yearlings	40.7	47.1	40.1	44.0	40.3	40.7	36.1	38.0	40.0
Average Age	2.9	2.7	2.8	2.8	2.9	2.7	2.8	3.0	2.8
Adult Bucks per 100 Adult Does	143.9	128.8	170.8	154.8	139.9	123.6	117.0	110.8	136.3
Buck Fawns per 100 Doe Fawns	77.5	181.3	132.9	112.8	95.1	88.2	96.0	86.0	103.7
Fawns per 100 Adult Does	110.4	124.5	110.8	135.0	101.1	114.7	113.2	88.2	111.7
Hunter Days per Deer	18.0	15.7	13.6	13.0	14.4	13.1	15.5	18.5	15.2



(1) A Great amount of new and increased posting of land was prevalent throughout the entire island. Many hunters left the island during the first few days of the hunt as they were unable to find a suitable place to hunt.

(2) Weather conditions were far from perfect. Table V is self-explanatory on the role that the weather played in decreasing hunter success.

(3) With the two deer seasons within the Sudbury District, the expected "surge" of hunters to the Island during the last two weeks of November did not take place, possibly because of deer hunting success prior to the season on the Island and certainly as a result of the other 4 points combined.

(4) The extensive publicity programme prior to the Island deer season had the desired effect of establishing the fact that Manitoulin Island is private property and, as such, landowners would be prepared to prosecute trespassers. This wide publicity of hunter-farmer conflict certainly had a great effect of decreasing the number of hunters on the Island. It had such an effect that many hunters coming onto the Island would stop at the Checking Station and present their letter of hunting permission to us. In fact, they thought they needed a letter of permission before they would even be allowed on the Island.

(5) General remarks and observations certainly showed that many deer were travelling or were in fact already in their deer yards by the time the season opened. This resulted in heavy deer kills in certain areas (mainly along the south shore) and almost nil deer kill along the northernmost edge of the Island.

The Little Current Checking Station is a non-compulsory road-block and as such many unsuccessful hunters do not stop. It would be extremely difficult to place a figure on the number that did not stop but I believe 500 would not be far from the actual figure. If this is, in fact, true, the deer hunter success on the Island would drop to less than 10%.

In Table IV are some statistics which would seem to bear out an assumption put forward in the "Manitoulin Island Deer Hunt 1967" that there may be a decline in the total number of deer on the Island. A closer look shows that the number of fawns per 100 adult does is the lowest on record and the percent yearlings is also the lowest on record through the Check Station.

TABLE V

WEATHER CONDITIONS - MANITOULIN ISLAND - NOVEMBER 1963

DATE	TEMPERATURES		PRECIPITATION			HUMIDITY		WIND			SUNRISE	SUNSET
Nov.	Max.	Min.	Snow	Rain	Water Equiv.	Max.	Min.	Direction	Relative	Gusting	a.m.	p.m.
2	51.0	39.3	Ø	.01	.01	86	57	E	26	33	7.12	5.15
3	44.2	37.4	Tr	.01	.01	83	58	E	17	25		
4	50.5	34.9	Ø	Ø	Ø	93	71	N	6	11	7.15	5.12
5	45.3	35.6	Ø	Ø	Ø	98	81	E	13	25		
6	36.3	32.1	Tr	Ø	Tr	89	71	E	13	25	7.18	5.09
7	36.4	32.5	Tr	Tr	Tr	94	74	E	15	25		
8	38.0	33.8	Tr	Ø	Tr	92	82	E	11	25	7.21	5.07
9	40.0	33.2	0.1	.02	.03	97	89	NE	7	12		
10	38.0	23.4	Ø	.01	.01	94	71	E	13	20	7.22	5.04
11	38.7	33.0	Tr	Tr	Tr	84	87	NE	7	13		
12	34.2	27.2	Ø	Ø	Ø	89	82	E	18	30	7.25	5.02
13	38.0	26.5	Ø	Ø	Ø	98	80	NW	9	15		
14	42.1	27.3	Ø	Tr	Tr	95	75	SW	4	8	7.28	4.59
15	38.2	35.2	Tr	.34	.34	100	74	E	7	15		
16	37.2	30.6	Ø	Ø	Ø	85	80	NE	15	30	7.31	4.57
17	32.4	30.1	0.2	Ø	.02	91	73	E	18	28		
18	32.4	24.0	9.0	0	.30	94	77	E	15	28	7.34	4.55
19	28.8	20.1	0.5	0	.04	90	80	NW	18	38		
20	32.8	25.1	0.3	0	.03	89	77	NW	16	30	7.36	4.53
21	40.4	30.3	2.0	.11	.31	97	74	SW	19	35		
22	39.4	29.6	Tr	.01	Tr	92	89	W	16	37	7.39	4.50
23	44.5	30.2	Ø	Ø	Ø	97	78	SE	7	15		
24	42.8	30.3	0.6	.01	.07	93	82	NW	15	28	7.42	4.50
25	38.2	25.0	Tr	Ø	Tr	83	82	NW	10	25		
26	38.8	22.0	1.4	Ø	.14	97	80	E	4	11	7.45	4.49
27	34.8	22.0	Ø	Ø	Ø	82	80	SW	5	10		
28	37.2	23.0	4.0	Ø	.4	99	87	NE	14	43	7.48	4.48
29	28.0	10.0	2.8		.25	89	80	NE	11	30		
30	36.2	8.4	Tr	0	Tr	94	80	SW	8	23	7.50	4.47

The winter of 1967-68 on Manitoulin Island was above-average as far as temperature and recorded snowfall is concerned. In other words, it was an ideal winter and therefore these decreases could hardly be blamed on the weather aspect.

A quick look at the following table shows only 10 deer being killed on Manitoulin Island in 1968 by vehicles while in 1967, 24 deer were killed. No figures are available for years prior to 1967 but by personal communication with Mr. Zimmerman (Detachment Head at Manitoulin Island for the past 6 years) road kills in years prior to 1967 were far higher than at present.

TABLE VI

NON-HUNTING DEER KILLS ON MANITOULIN ISLAND - 1968

Road Kills	10
Illegally Shot	4
Run into Fence	1
Drowned	2
Wolves	2
Unknown	1
Total	20

If, in fact, the deer herd is declining, then the number of road kills might be a significant figure in determining this because the Island population is relatively stable with no yearly increase of vehicular traffic.

A further hint of a declining deer herd is borne out by the hunter days per deer in Table IV. It took more man-days to bag a deer in 1968 than any previous year on record.

Also, the average age of adult deer is the oldest in the past 8 years. It appears that our deer population is getting older. When the birth rate increases in a population, there is a tendency for the population to consist of a predominance of young animals. It is said to be a young population and considered to be growing. Conversely, if the birth rate decreases, there is a tendency, because of failure to recruit the younger age-classes, for the population to become senile and to consist mostly of older animals. Such a population is said to be declining. Preliminary indications point to the fact that the population is declining. If this is true, an unforeseen benefit from our vast programme of publicity and enforcement in 1968 may have had the effect of limiting the number of hunters to such a degree that the deer herd may have an added "lease" on life.

TABLE VII

TEMPORAL DISTRIBUTION OF DEER KILLED ON MANITOULIN ISLAND 1968

Date	Nov. Mon. 13		Nov. Tues. 19		Nov. Wed. 20		Nov. Thur. 21		Nov. Fri. 22		Nov. Sat. 23		Nov. Sun. 24		Nov. Mon. 25		Nov. Tues. 26		Nov. Wed. 27		Nov. Thur. 28		Nov. Fri. 29		Nov. Sat. 30	
Age / Sex	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
1/2	17	14	14	24	24	22	17	12	20	13	10	12	-	2	2	1		7			1	3		4	3	3
1 1/2	12	5	17	11	17	10	12	11	6	13	6	13	1	1	2	1	1	1	2	1	1	1	2	2	2	
2 1/2	12	9	8	13	6	11	7	14	8	13	8	5	2	5		2			2	1	2		1	1		
3 1/2	13	4	11	9	11	10	8	6	11	5	7	9	3	4	1	2	1	1	1	1		1				
4 1/2	10	1	7		9	5	5	4	5	3	3	1	1	1	2	1			1			2		1	1	1
5 1/2	8	1	2	3	3	1	3		2		2	1	2		1				1	1	1					
6 1/2		1				2	1	1		1			1													
7 1/2			1				1					1														
7 1/2+					1	1		1		1		1	1		1	1										
Not Aged	10	5	12	12	2	3	4	2	2	7	2	6	1	2	2	2			2	2	1	3	1			1
Sub-Total	77	40	72	72	73	65	55	54	52	56	46	49	20	18	11	10	2	9	7	7	6	10	4	8	7	5
TO TAL	117		144		138		109		108		95		38		21		11		14		16		12		12	

A predicted decrease in adult bucks per 100 adult does in "Manitoulin Island Deer Hunt 1967" materialized perfectly in 1968 and further confirmed suspicions that the sex ratio is gradually swinging towards a higher percentage of female deer in the legal deer kill.

Table VII showing the temporal kill on the Island paints a rather unusual picture of the deer kill. In the first instance, the highest deer kills were recorded during the second and third day of the hunting. Table V shows that on opening day, 9.0 inches of snow fell which would explain the low opening day kill. The expected "surge" of hunters on the weekend did not eventuate and, as a result, the deer kill on Saturday did not show an increase over the deer kill on Friday, which is usually the normal course of events.

As usual, a hunt camp form was distributed at the Check Station and all returned forms are tabulated in Table VIII. In addition, a questionnaire was attached to the hunt camp form asking for expenditures during the deer hunt. These expenditures are tabulated in Table IX.

TABLE IX

HUNT CAMP EXPENDITURES OF 233 DEER HUNTERS 1968

ITEM	COST
Ammunition	$ 701.00
Equipment	1,51[illegible].00
Refreshments	2,07[illegible].00
Food	3,551.00
Lodging	6,000.00
Gasoline	1,07[illegible].00
Total	$ 16,000.00

From the total in Table IX, $12,534.00 was actually spent on Manitoulin Island. A total of $43.[illegible] was spent per man. This is very comparable to $43.57 per man on a similar survey last year.

PART II

Manitoulin Island is all privately owned. In past years, complaints from farmers regarding trespass and malicious damage were numerous and eventually led to hunter-farmer relationships which were strained to the breaking point.

TABLE VIII

TEMPORAL DISTRIBUTION OF DEER KILL

FROM HUNT CAMP FORMS

M A N I T O U L I N I S L A N D

1968

	No. Sportsmen Hunting	No. Parties Reporting	Deer Killed	% Total Kill	% Hunter Success	Days Effort per Deer Killed
Nov. 18	253	[illegible]	21	16.8	[illegible]	12.0
Nov. 19	279	[illegible]	26	20.8	[illegible]	10.7
Nov. 20	283	[illegible]	29	23.2	[illegible]	9.8
Nov. 21	238	[illegible]	18	14.4	[illegible]	13.2
Nov. 22	262	[illegible]	17	13.6	[illegible]	15.4
Nov. 23	151	[illegible]	13	10.4	[illegible]	11.6
Weeks Totals	1466	[illegible]	124	99.2		11.8
Nov. 24	47	10	1	0.8	2.1	47.0
Nov. 25	23	4				
Nov. 26	6	1				
Nov. 27						
Nov. 28						
Nov. 29						
Nov. 30						
Weeks Totals	76	15	1	0.8		76.0
GRAND TOTALS	1542	[illegible]	125	100.0		12.3

Total Number of Sportsmen Hunting	301
Total Camps Reporting	56
Hunter Days Per Deer	12.3
Total Number of Deer Killed	125
Hunt Camp Success for Season	49.4

These hunter-farmer relationships had deteriorated to such an extent that on December 8th, 1967, a meeting was held at Little Current between the Islanders and Department of Lands and Forests staff to discuss future proposals for the Island Deer Hunt.

At this meeting, the residents of Manitoulin presented their views on the hunt and put forward a recommendation that would, in effect, be a recommendation to establish a special Manitoulin Island Deer Licence which would eliminate the number of "transient" hunters on the Island. As the Department of Lands and Forests would not be a party to such a recommendation, the Department reciprocated by promising an accelerated programme of enforcement and a special publicity campaign which would help to deter, alleviate and hopefully stop all of the trespass and damage problems which occur during the deer hunt.

Two weeks prior to the deer season, a large 2 ft. by 12 ft. sign was erected at the Little Current bridge telling all hunters that Manitoulin Island is all private property and that hunting is by permission of the land-owners only. The sign was lighted at night so as to be visible 24 hours a day.

A week prior to opening of deer season, a series of T.V. commercials were shown on the local T.V. station during prime time. Also, coverage by the 3 local radio stations was given as well as advertisements in the local paper.

The entire publicity programme was designed and geared to improve hunter-farmer relationships by letting the hunters know that hunting on Manitoulin was by permission only.

An itemized summary of the results of this campaign appear in the following table:

TABLE X

ENFORCEMENT DURING
1968 MANITOULIN ISLAND DEER HUNT

Conservation Officer - Hunter Contacts	4,300
Conservation Officer - Farmer Contacts	157
No. of Trespass Complaints Received	11
No. of Trespass Charges Laid	0
No. of Rifles Seized	23
No. of Total Charges Laid	30
No. of Deer Seized	5
Total Cost of Charges (i.e., if Convictions registered)	$1,045

In one short statement, the success of the added enforcement and publicity campaign can be noted by the relatively small number of charges laid. In 1967, over 60 charges were laid by a complement of 16 Conservation Officers. This year, the 30 charges were laid by a complement of 23 Conservation Officers. It was a general concensus of opinion that the amount of publicity given the Manitoulin Island Deer Hunt played the major role in curbing the offence of trespass.

Although the deer hunt was successful, the cost incurred by the added enforcement was quite considerable. No total cost for the years previous can be given but Table IX gives an outline of the costs incurred in 1968.

The 3,740 hunters checked through the Little Current Checking Station spent $41,234.00 on licence fees. When one considers that the total cost of enforcement on Manitoulin was $16,655.00, approximately $4.46 of each hunter's licence fee hunting on Manitoulin Island goes towards the enforcement effort. Whether or not this cost has to be justified by a specific degree of effort in enforcement is unknown, suffice it to say that the Islanders were generally satisfied with the way in which the enforcement was handled.

From the hunters' standpoint, the main complaint was that they were being asked too many times to produce their licence on demand from a Conservation Officer. One particular hunter complained that he had been stopped on 9 different occasions.

TABLE XI

DIRECT AND INDIRECT COSTS OF THE MANITOULIN DEER HUNT 1963

DIRECT COSTS

Helicopter	$ 3,575.00	
Lighted Sign	260.00	
Propane	63.00	
Groceries	687.00	
Camp Rental	410.00	
Restaurant	834.82	
Storage	50.00	
Hydro	100.00	
T.V. Advertisements	730.00	
		$ 3,759.82

INDIRECT COSTS

Department Mileage - 29,620 @ 6.5¢	1,925.30	
Private Mileage - 1,813 @ 9.0¢	163.62	
- 400 @ 15¢	60.00	
		2,148.92

SALARIES (Average)

12 C.O. Group 2	2,784.00	
2 C.O. Group 3	450.00	
4 C.O. Group 4	969.00	
2 C.O. Group 5	600.00	
1 C.O. Group 7	396.00	
2 Biologists I	600.00	
4 F.T. Group 1	650.00	
3 F.T. Group 2	569.00	
2 F.T. Group 4	237.00	
1 F.T. Group 6	291.00	
1 Casual	200.00	
		7,746.00

T O T A L C O S T S	$ 13,654.74

CONCLUSIONS AND RECOMMENDATIONS

Dawson and Robinson Townships supported 48.0% of the total number of hunters who shot 40.0% of the deer. Any planned land acquisition on Manitoulin should be directed towards acquiring the Ontario Paper's land in Dawson and Robinson. The acquisition of this land would help greatly to alleviate the hunter-farmer conflict on the Island.

Hunter success again showed a marked decline. Increased posting of land, severe weather conditions, later deer season, etc., certainly helped to keep the deer kill down; however, a look at Table IV showing deer statistics for the past 3 years, indicates that there may be a decline in total number of deer on the Island.

No quantitative description describing the Island deer population is known, other than hunter kill statistics. In 1969, a population estimate using an improved technique of crotesing counts should be initiated in an attempt to place a figure on the total number of deer on the Island, whereby we can figure out the sustained yield.

It should be recommended that the last 2 weeks in November remain the deer season on Manitoulin for the present time. The later deer season certainly accomplished what we originally set out to do - mainly soothe hunter-farmer relationships. The only drawback from this late season appears to be the tendency of deer to start congregating in the deer yarding areas.

The publicity campaign appeared to have the desired effect of curbing the trespass problem and improving hunter-farmer relationships. As a direct result of the publicity, the added enforcement was not needed. In 1969, the publicity campaign should be enlarged and added to while the complement of men can be decreased. I feel that 12 Conservation Officers could adequately handle the enforcement on the Island.

The usefullness of the helicopter should be questioned. Two days prior to the season, it may have a small deterrent value but did not have any value during the actual deer season. I feel that the helicopter was of very limited value on the Island considering the high cost of the machine.

REFERENCES

Mosby, H.S. - Wildlife Investigational Techniques (Second Edition: Revised)

Thompson, G.E. - Manitoulin Island Deer Hunt 1967

Zimmerman, F.A. & Lawrence W.J. 1967 - A Summary of The Manitoulin Deer Hunt 1958-1966

HUNTER NUMBERS AND HUNTER SUCCESS IN SUDBURY DISTRICT 1960

TABLE I

SECTION A

SUMMARY OF SUCCESS OF DEER HUNTERS CHECKED

IN THE FIELD AND AT CHECKING STATIONS.

District Manitoulin Year 1960

	RESIDENTS		NON-RESIDENTS		Total
	Organized	Non-organized	Organized	Non-organized	
Number of Hunters Checked	1716	1981	140		3746
Number of Deer Examined	426	392	42		860
Percentage Hunter Success	24.8	20.8	29.2		23.0
Total Days of Hunting	8454	6805	774		15913
Hunter Days Per Deer	19.8	17.1	18.4		18.5

TABLE II

DEER AGE CLASS DISTRIBUTION

District Manitoulin Year 1968

Age	Bucks	Does	Sexes Combined	% of Total
1 1/2	86	77	163	30.93
2 1/2	55	79	134	25.43
3 1/2	64	51	115	21.82
4 1/2	50	19	69	13.09
5 1/2	15	11	26	4.93
6 1/2	3	5	8	1.52
7 1/2	6	6	12	2.28
Totals	279	248	527	
Unaged	44	44	88	
Total Adult Deer	323 *	292 *	615	
Fawns Checked	120	125	245 *	
Total Sexed Deer	443	417	860 *	

Deer not Sexed or Not classified as to Fawn or Adult Nil

Total Deer Checked (not used in calculations) 860

SUMMARY OF RESULTS

Percentage of Deer Checked		Average Age of Adult Deer Checked	
Adult Bucks	37.56	Adult Bucks	3.09
Adult Does	33.95	Adult Does	2.88
Fawns	28.49	Fawns	

* - Figures used for percentages

Key: Res = Resident Org = Organized
Cas = Casual Non-res= Non-resident

	Number of Deer Killed					Distribution of Deer Kill			Number of Hunters			Number of Man-Days		
	Buck	Doe	♂ Fawn	♀ Fawn	Total	Res Cas	Res Org	Non-res	Res Cas	Res Org	Non-res	Res Cas	Res Org	Non-res
Allen	14	14	7	6	41	10	29	2	101	104	13	306	407	53
Assiginack	25	15	4	9	53	20	30	3	70	72	14	259	370	66
Barrie Is.	2	0	0	2	4	1	3	0	3	7	12	23	19	8
Bidwell	9	13	7	5	34	15	19	0	99	51	5	266	233	28
Billings	15	11	2	2	30	9	18	3	82	81	5	217	409	22
Burpee	27	18	7	7	59	19	35	5	59	114	5	120	561	31
Campbell	11	4	5	5	25	16	9	0	82	40	4	217	199	20
Carnarvon	20	11	7	6	44	21	19	0	163	135	4	514	708	13
Dawson	80	74	28	35	217	88	123	6	353	434	16	1482	2354	105
Gordon	4	6	3	2	15	11	4	0	74	27	4	234	98	14
Howland	10	6	1	2	19	11	8	0	54	30	0	163	142	0
Mills	10	12	4	3	29	19	10	0	65	43	9	233	102	60
Robinson	65	74	31	26	196	103	85	8	418	390	28	1581	1936	146
Sandfield	7	6	4	5	22	11	7	4	58	51	16	217	216	71
Sheguiandah	5	4	1	5	15	6	7	2	43	26	5	151	111	13
Tehkummah	19	24	9	5	57	28	20	9	155	111	19	532	429	124
TOTALS	323	292	120	125	860	392	426	42	1881	1716	149	6685	8454	774

TABLE XIII

KERWIN LAKE BROOK TROUT STUDY

PRELIMINARY REPORT

by
C. E. Olver

ABSTRACT

Anglers fished for an estimated 1,410 hours to catch 174 brook trout at Kerwin Lake during the winter of 1966. The fishing intensity on this 93 acre lake was 15.1 man-hours of effort per surface acre. The average rate of success was 0.14 fish per man-hour. The average weight of the fish caught was 0.7 pounds. The harvest of 105 pounds represented a yield of 1.19 pounds.

A growth rate based on calculated total lengths was determined. The brook trout fishery was supported by fish of age group II and age group III. Age 2 fish dominated the catch. The annual mortality rate between between the second and third year of life was estimated at 70 per cent.

Only 19 fish of 4,000 planted in May of 1967 were estimated to have been caught in 1968. The return was 0.5 per cent. The return in terms of weight (15.2 pounds caught of 174 pounds planted) was 8.7 per cent.

The calculated cost of rearing 4,000 marked brook trout was $1,000.00 or $5.75 per pound ($2/pound). The value of the planted fish caught by anglers was $52.63 per fish or $87.40 per pound. In terms of fish flesh the angler realized a return of 9 cents on the dollar for a cost-benefit ratio of 1:.09.

As a result of this study the stocking program on Kerwin Lake will be discontinued.

INTRODUCTION

A winter creel census was conducted on Kerwin Lake in Township 27, Range 13 of the Sault Ste. Marie District during the months of January, February, and March of 1968. The lake is located approximately 41 miles north of Sault Ste. Marie via Highway 17 and thence eastward, a distance of 5.5 miles on a forest access road to the lake. Due to the poor condition of the access road this lake is seldom fished during the spring and summer except by one tourist operator who uses a four-wheel drive vehicle to convey his guests to the lake.

Kerwin Lake, which has a surface area of 80 acres, was surveyed by two university students in August of 1968. The only game fish in the lake is the brook trout (Salvelinus fontinalis). The northern creek chub (Semotilis atromaculatus) and an unidentified stickleback species are the only other fish species present (Fung and Logan, 1968, unpublished).

A total of 10,000, fin-clipped brook trout were planted by the air drop method in Kerwin Lake from the spring of 1964 to the spring of 1967. The objectives of the creel census were two-fold; to estimate the harvest of brook trout and to determine the importance of hatchery planted fish to the sport fishery.

METHODS

A ground (21 days) and aerial (6 days) census was carried out at Kerwin Lake on 27 of 91 days between January 1 and March 31, 1968 (Appendix Table I). Sixteen of the 65 weekdays (24.3 per cent) and 11 of the 26 weekend and holiday days (42.3 per cent) were censused. A separate interview sheet was filled out for each party interviewed (Appendix Table 2). A resume of each day's activity was entered on a daily summary sheet (Appendix Table 3).

A total of 30 fish were examined for the presence of fin clips. Information concerning total length, round weight, sex, and state of maturity was collected from each fish. Scale samples were taken from 35 of the 30 fish sampled.

All anglers present on the lake during the ground census were checked at the end of their day's fishing. Consequently, the catch per unit-of-effort (C.U.E.) was based only on completed trip data.

Data collected from a limited creel check in the winter of 1967 (26 samples) and the 1968 lake survey (41 samples) has been utilized, where applicable, to determine the growth rate, length-frequency distribution, age composition, and mortality rate of Kerwin Lake brook trout.

RESULTS

Angling Statistics

The 78 anglers interivewed on the lake during the ground census caught 55 brook trout during 370.5 hours of fishing. The estimated harvest was 174 fish at a total weight of 104.4 pounds (Table I). The yield was 1.19 pounds per acre. A detailed analysis of fishing pressure, catch per unit-of-effort (C.U.E.), and harvest for weekdays and weekends and holidays for each month is presented in Appendix Tables 5 through 7.

The calculated fishing pressure was 1,410.1 man-hours which represented a fishing intensity of 16.1 man-hours of effort per surface acre. The heaviest fishing pressure occurred in the month of January.

More fish were caught in January (124) than in any other month. This value, which represented 71 per cent of the total estimated catch, is attributed to the C.U.E. (0.21) for January which was 3 times greater than the rate of success during February (0.07) and 3 1/2 times greater than the C.U.E. for March (0.06). The C.U.E. season average was 0.14 fish per man-hour.

TABLE I Summary of angling statistics of the brook trout fishery from Kerwin Lake, 1960

Month	Fishing pressure (man-hrs.)	C.U.E.	Harvest (Nos.)	Av. Weight (Lbs.)	Harvest (Lbs.)	Pounds/ Acre
January	584.2	0.21	124	0.6	70.6	
February	361.6	0.07	25	0.7	17.5	
March	472.3	0.06	25	0.6	16.5	
Season Estimates	1,410.1	0.14	174	0.7	104.6	1.19

Fifty-two of the 78 anglers checked (66.7 per cent) did not catch any fish. The average number of fish caught per angler was 0.70. The average length of the fishing day, based on completed trip data, was 4.86 hours (4 hours and 52 minutes).

Creel census information was recorded during the spring and summer of 1968 (Appendix Table 4). Only 4 people are known to have fished the lake during May. No anglers were observed during 6 aerial flights over the lake in June, July and August. No harvest estimates could be made with the limited data available for this period of time but it was evident that the catch of brook trout during the spring and summer was minimal compared to the catch from the winter fishery in January, February, and March.

Age, Growth and Maturity

The calculated total length of brook trout at the end of each year of life is presented in Table 2. Data from the 1967 creel census (26 aged samples), the 1968 creel census (35 aged samples), and the 1968 lake survey (38 aged samples) was combined and each age group for both native and hatchery planted fish was analyzed separately. The slight difference in the growth rate between native fish and brook trout of hatchery origin may be due to the small number of planted fish in the sample. The mean calculated total length for all fish at the end of year of life 1, 2, 3, and 4 was 5.4, 10.9, 14.5, and 17.8 inches respectively. The body-scale relationship was not determined.

The average total length of the 1967 sample was 13.0 inches. Individual weights were not recorded for these fish. The average total length of angler-caught brook trout in 1968 was 11.7 inches, and the average weight was 0.7 pounds. Total elngths of these fish ranged from 7.0 to 16.0 inches, and weights varied between 0.1 and 1.8 pounds.

Brook trout were first caught in proportion to their angling availability at a length of 12.0 to 13.0 inches in 1967 and 11.0 inches in 1968 (Table 3). The apparent reduction of approximately 1.0 inch in the size at which brook trout first became fully vulnerable to the fishery was also reflected in a decrease of 1.3 inches in the average total length of brook trout caught in 1967 (13.0 inches) and 1968 (11.7 inches). Approximately two-thirds of the brook trout taken by anglers were between 11.0 and 14.9 inches in total length.

The brook trout fishery in Kerwin Lake was supported by fish age 2 and age 3 (Table 4). The observed catch in both the 1967 and 1968 creel census was dominated by two year old fish. Age group II fish averaged 70.5 per cent of the total aged catch over this two year period.

Table 2. Calculated total lengths of brook trout from Kerwin Lake

	Age Group	No. of Fish	Calculated length at end of year of life			
			1	2	3	4
Native fish	I	25	6.0			
	II	49	5.2	11.0		
	III	17	4.9	10.1	14.4	
	IV	1	4.3	10.5	17.2	19.3
Mean calculated length			5.4	10.8	14.6	19.3
Number of fish			92	67	18	1
Hatchery fish	II	4	6.1	12.4		
	III	2	4.2	10.1	14.4	
	IV	1	6.0	10.9	13.7	16.3
Mean calculated length			5.5	11.5	14.2	16.3
Number of fish			7	7	3	1
Mean calculated length of native and hatchery fish			5.4	10.9	14.5	17.8
Number of fish			99	74	21	2

Table 3. Length-frequency distribution of angler-caught brook trout at Kerwin Lake, 1967 and 1968.

	Total length in inches													
	7	8	9	10	11	12	13	14	15	16	17	18	19	Total
1967	1	1	1	2	2	[illegible]	5	[illegible]	1	2	1	-	1	[illegible]
1968	1	4	2	3	[illegible]	[illegible]	[illegible]	4	1	1	-	-	-	[illegible]
Total	2	5	[illegible]	5	12	12	11	7	2	[illegible]	1	-	1	64
% of total	[illegible]	7.8	4.7	7.8	[illegible]	[illegible]	17.2	[illegible]	[illegible]	4.7	1.5	-	1.5	[illegible]

Table 4. Age composition of angler-caught brook trout from Kerwin Lake

	Age Group				
	I	II	III	IV	Total
1967 creel census					
Number in sample - native fish	0	15	7	1	23
- hatchery fish	0	0	2	1	3
Total	0	15	[illegible]	2	[illegible]
Percentage frequency	0	[illegible]	[illegible]	7.8	100.0
1968 creel census					
Number in sample - native fish	0	24	7	0	31
- hatchery fish	0	4	[illegible]	0	4
Total	0	[illegible]	7	0	35
Percentage frequency	0	[illegible]	[illegible]	0	100.0
Combined total	0	[illegible]	[illegible]	2	61
Percentage frequency	0	70.5	[illegible]	3.3	100.0

No immature brook trout were observed during the 1968 creel census or the 1968 lake survey. The sex and state of maturity of fish caught during the 1967 creel check was not recorded. It is believed that brook trout in Kerwin Lake are able to spawn for the first time by the fall of their second year of life. One female sampled in the winter of 1968 had not released her eggs. This fish was of hatchery origin.

Mortality Rate

Independent estimates of the rate of survival ($\hat{s}$) and its complement, the annual mortality rate (a), were made for native brook trout caught in Kerwin Lake during the creel census of 1967 and 1968, and the 1968 lake survey. The mortality rate derived from an age composition analysis of 1,297 brook trout captured in lake surveys throughout the District was included to provide an additional basis for comparison.

The mortality rate between the second and third year of life for all three estimates was quite similar; creel census data - 64.1 per cent, lake survey data - 70.0 per cent, and District average of 72.3 per cent (Table 5). It is apparent that the annual mortality rate of Kerwin Lake brook trout between age group II and age group III is in the order of 70 per cent per year. It is also evident that few fish attain the age of 4 years in Kerwin Lake.

The Role of Hatchery-reared Brook Trout in Kerwin Lake

The planting record of 10,000 yearling, adipose-clipped, brook trout released over Kerwin Lake from a moving fixed-wing aircraft was as follows:

1964 - May 7 3,000
1965 - May 10 3,000
1967 - May 12 4,000

The age composition and survival rate of angler-caught brook trout clearly indicated that, by the winter of 1968, the brook trout planted in 1965 (age 4) and 1964 (age 5) had passed through the fishery. However, as brook trout enter the winter fishery at age 2 it was possible to evaluate the contribution of the 1967 plant (1966 year class) to the angler's catch in 1968.

Only 4 hatchery-reared brook trout of the 4,000 planted in 1967 were observed during the 1968 creel census and the total number estimated to have been caught was 19 fish (Table 6). The return was slightly less than one-half of one per cent (<0.5 per cent).

Table 5. Estimates of survival rate and mortality rate for native Kerwin Lake brook trout

	Age Group	Number	s^1	a^2
Kerwin Lake creel census (1967 and 1968 data combined)	II	39	35.9	64.1
	III	14	7.1	92.9
	IV	I		
Kerwin Lake lake survey	I	25	40.0	60.0
	II	10	30.0	70.0
	III	3		
District average values	I	403		
	II	306	27.1	72.9
	III	150	28.9	71.1
	IV	46	21.7	78.3
	V	10	20.0	80.0
	VI	2	50.0	50.0
	VII	1		

1 Annual survival rate - expressed as a percentage

2 Annual mortality rate - expressed as a percentage

The total weight of the 4,000 brook trout when planted was 174 pounds (average of 23 fish per pound). The estimated catch was 15.2 pounds or 8.7 per cent of the number of pounds planted in 1967 (Table 6). For every pound of fish planted the return to the angler was less than one-ninth of a pound (0.087 pounds).

Few anglers fished Kerwin Lake during the spring and summer of 1968. No fish of hatchery origin were captured during the August, 1968 lake survey. It is assumed, therefore, that the catch of hatchery-reared brook trout during the winter of 1968 approximated the annual catch of marked brook trout during the 1968 calendar year.

Cost-Benefit Analysis

The cost of raising brook trout in the Tarentorus Hatchery from egg incubation to yearling size, including the cost of fin-clipping, was approximately 25 cents per fish in 1966 (Don Storms, personal communication). The additional expense of stocking these fish was not determined. The figure of 25 cents per fish used in the following calculations is considered to be a minimum value.

The cost of rearing the 4,000 brook trout (174 pounds) planted in Kerwin Lake in 1967 was approximately $1,000.00 or $5.75 per pound. The estimated value of capturing 15 marked brook trout weighing 15.2 pounds in 1968 was $52.63 per fish or $87.40 per pound. The return of the Department's investment of $1,000.00 was, on a poundage basis, $87.40 or 9 cents on the dollar. The cost-benefit ratio was 1:.09 ($1.00 invested for 9 cent return). No effort was made to determine the intangible benefits derived by the anglers who caught planted brook trout.

Although the accuracy of the figures presented may be subject to debate, it is still believed that the results clearly show a gross imbalance between the calculated cost of the planting program and the benefits derived by the angler. This is the first attempt that the District has made at relating the costs and benefits involved in the stocking of fish. It is hoped that a limited understanding of the economics of cost-benefit ratios has not led to an incorrect interpretation concerning the value of the planting program.

DISCUSSION AND CONCLUSIONS

Most of the brook trout caught in Kerwin Lake in 1968 were taken during the ice fishing season which lasted from early January to late March or early April. Brook trout first entered the fishery as two year olds. It appears that the hatchery fish planted in May of any year are not caught in any number until January of the following year.

TABLE C Contribtuion of the 1967 plant (1966 year class) of hatchery-reared brook trout to the sport fishery at Kerwin Lake in 1968

Age group	II
Year of capture	1968
No. of age 2 fish in sample	28
Sample size	35
No. of hatchery fish age 2	4
Percentage of age 2 fish	75.0
Percentage of hatchery fish age 2	14.3
Estimated harvest (numbers)	174
Estimated harvest of age 2 fish	130
Estimated harvest of hatchery fish age 2	19
Number planted	4,000
Per cent captured	<0.5
Average weight (pounds)	0.8
Estimated harvest (pounds)	15.2
No. of pounds planted	174
Per cent of pounds captured	8.7
No. of pounds captured/no. of pounds planted	0.087

The mortality rate associated with the 8 month delay between time of planting and time at which the fish become vulnerable to capture is not known, but must be quite high. The extremely small number of age group II hatchery fish caught during the winter of 1968 tends to confirm this view. The mortality rate of native brook trout between age 1+ and 2+ captured by gill nets in August of 1968 was 60 per cent.

Brook trout angling is dependent upon two and three year old fish with age 2 fish dominating the catch. A mortality rate in the order of 70 per cent effectively removes the majority of age 2 fish before they reach the age of three years.

The management implications of a put and delayed take stocking program in which the species planted is very short-lived and the population has a high natural mortality rate are quite evident. Planting under such conditions can be a very expensive proposition.

The presence in the lake of a brook trout population sustained by natural reproduction undoubtedly affected the survival of the planted fish. Certainly, the release of domestic stock into a lake containing a natural population was not very successful in providing additional fish to the angler, especially when the number of fish planted is considered.

The reason for the failure of the hatchery plant to survive in nay appreciable numbers is not clear. Intraspecific competition has been mentioned as one possibility. Hatchery fish could be more susceptible to predation than native fish. Fraser (1969) working in 2 lakes in Algonquin Park, Ontario found that air dropped brook trout yearlings had a significantly lower survival than brook trout planted by hand. Since the air release method was also used at Kerwin Lake, it is probable that part of the failure of the 1967 plant can be attributed to the method of stocking.

Ontario biologists have long been concerned with production in inland trout waters. Production may be defined as the yield in weight per unit area per year. It seems to this writer that a more realistic approach in assessing hatchery returns in a fishery could be achieved by analyzing the relationship between the weight of all fish captured and the weight of all fish planted. It is apparent that most hatchery plants are subject to a high level of mortality. As a result percentage returns by number are often very low. However, it is possible that the growth attained by the survivors may equal or even surpass the weight of the fish at the time of planting.

The goal of a stocking program should be to achieve a balance between weight of fish planted and weight of fish captured. A fishery in which twice as many pounds of hatchery planted fish were taken by

anglers as were originally planted would have reduced the cost per pound by 50 per cent. In fisheries in which less than a 1:1 ratio exists, a decision regarding further planting must be made.

The return of only 8.7 per cent of the pounds of fish planted in 1967 and the low cost-benefit ration of 1:.09 ($1.00 invested for a 9 cent return) justifies the discontinuation of the stocking program on Kerwin Lake; a natural brook trout lake.

ACKNOWLEDGEMENTS

My sincere appreciation is extended to Conservation Officer Bryon Hall who was responsible for the creel census at Kerwin Lake. The co-operation of pilot Bud Evans is gratefully acknowledged.

LITERATURE CITED

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APPENDIX TABLE 1 - Creel Census Schedule for Kerwin Lake, Winter 1960, with a Summary of Angler Activity

Date		Anglers Censused	Anglers NOT Censused	Total Anglers	Incomplete Trips	Complete Trips	Aerial Census	Grand Total
January	5 Friday	0	0	0	0	0		
	6 Saturday						0	
	12 Friday	3	0	3	0	3		
	13 Saturday						3	
	14 Sunday	16	0	16	0	16		
	15 Monday	5	0	5	0	5		
	19 Thursday	2	0	2	0	2		
	22 Monday	7	0	7	0	7		
	27 Saturday	9	0	9	0	9		
	31 Wednesday	2	0	2	0	2		
February	9 Friday	0	0	0	0	0		
	12 Monday	0	0	0	0	0		
	13 Tuesday	0	0	0	0	0		
	18 Sunday	0	0	0	0	0		
	22 Thursday	0	0	0	0	0		
	24 Saturday						7	
	28 Wednesday	7	0	7	0	7		
March	2 Saturday	3	0	3	0	3		
	5 Tuesday						3	
	7 Thursday	2	0	2	0	2		
	11 Monday	7	0	7	0	7		
	16 Saturday						5	
	17 Sunday	13	0	13	0	13		
	21 Thursday	0	0	0	0	0		
	24 Sunday						0	
	26 Tuesday	2	0	2	0	2		
	30 Saturday	0	0	0	0	0		
TOTALS		78	0	78	0	78	23	101

APPENDIX TABLE 2

CREEL CENSUS INTERVIEW SHEET

Lake_____ Date_____ Party No._____

Time Started Fishing_____ Time Checked_____ Complete Trip Time_____ Total Hours_____

Party Size_____ No. of Lines in Use_____ Residents_____ Non-residents___

Species Sought_____ Method of Travel_____

Species	Angler Number	Number Kept	Number Released	Method of Capture	Sample Numbers	* Remarks
Lake Trout	1					
	2					
	3					
	4					
	5					
Brook Trout	1					
	2					
	3					
	4					
	5					
Other Species						

* Please check for and record and Fin Clips

NOTE: One Interview Sheet to be filled out for each party

APPENDIX TABLE 3

DAILY SUMMARY SHEET

Lake _____ Date _____

Air Temperature _____ °F Weather _____

No. of Fishermen Interviewed _____ Parties - Completed Trips _____

No. of Fishermen Not Interviewed _____ Parties - Incomplete Trips _____

Total No. of Fishermen _____ Total Parties Interviewed _____

Distance from Travelled Road
(nearest 1/4 mile) _____

Method of Access _____

No. of Vehicles _____

No. and Species
of Fish Sampled _____

APPENDIX TABLE 4

CREEL CENSUS SCHEDULE FOR KERWIN LAKE, SPRING AND SUMMER

1963

Date	Anglers	Man-hours	Fish Kept	Flight time
Thursday May 16[1]	2	13.0	0	
Thursday May 30[1]	2	21.0	2	
Tuesday June 18	0			Not given
Monday July 1	0			10:15 a.m.
Saturday July 6	0			11:;5 a.m.
Saturday July 13	0			12:20 p.m.
Wednesday July 31	0			3:15 p.m.
Sunday August 11	0			3:30 p.m.
Thursday August 15	0			3:30 p.m.

[1] Data provided by Tourist Operator

APPENDIX TABLE 5 - MONTHLY SUMMARY (WEEKDAYS ONLY) OF ESTIMATED FISHING PRESSURE, C.U.E., AND HARVEST OF BROOK TROUT FROM KEJIMKUJIK LAKE, WINTER, 1968

	January	February	March	April
Fishing Days	14[1]	21	21	-
Sample days	5	5	5	0
Anglers present	19	7	14	-
Anglers censused (complete trips)	19	7	14	-
Av. No. of fishermen per day	3.8	1.4	2.8	-
Total man-hours (complete trips)	112.0	44.0	56.0	-
Av. No. of hours fished per fisherman (complete trips)	5.9	6.3	5.1	-
Daily effort (man-hours)	22.4	9.2	14.3	-
Monthly effort (man-hours)	313.6	184.8	300.3	-
No. of fish kept for C.U.E.	20	3	3	-
Man-hours for C.U.E.	112.0	44.0	56.0	-
C.U.E.	0.26	0.07	0.05	-
Est. harvest (number)	81	13	15	-
Average weight (pounds)	0.5	0.7	0.9	-
Est. Harvest (pounds)	40.5	9.1	13.5	-

1 First fishing day was Friday, January 12

APPENDIX TABLE 6 - MONTHLY SUMMARY (WEEKENDS AND HOLIDAYS ONLY) OF ESTIMATED FISHING PRESSURE, C.U.E., AND HARVEST OF BROOK TROUT FROM KERWIN LAKE, WINTER 1968

	January	February	March	April
Fishing days	6[1]	8	10	-
Sample days	3	2	5	0
Anglers present	33	7[2]	21	-
Anglers censused (complete trips)	25	9	16	-
Av. No. of fishermen per day	11.0	3.5	4.2	-
Total man-hours (complete trips)	102.0		65.5	-
Av. No. of hours fished per fisherman (complete trips)	4.1	6.3[3]	4.1	-
Daily effort (man-hours)	45.1	22.1	17.2	-
Monthly effort (man-hours)	270.6	176.8	172.0	-
No. of fish kept for C.U.E.	16		4	-
Man-hours for C.U.E.	102.0		65.5	-
C.U.E.	0.16	0.07[3]	0.06	-
Est. harvest (number)	43	12	10	-
Av. weight (pounds)	0.7	0.7[3]	0.3	-
Est. harvest (pounds)	30.1	8.4	3.0	-

1 First weekend fishing day was Saturday, January 13

2 Aerial census count

3 February weekday values

APPENDIX TABLE 7 - MONTHLY AND SEASON SUMMARY OF ESTIMATED FISHING PRESSURE, C.U.E., AND HARVEST OF BROOK TROUT FROM KERWIN LAKE, WINTER 1968

		Fishing pressure (man-hours)	C.U.E.	Harvest (Nos.)	Av. Wt. (Lbs.)	Harvest (Lbs.)
Jan.	Weekdays	313.6	0.26	81	0.5	40.5
	Weekends	270.6	0.16	43	0.7	30.1
	Monthly summary	584.2	0.21	124	0.6	70.6
Feb.	Weekdays	134.2	0.07	13	0.7	9.1
	Weekends	176.8	0.07	12	0.7	8.4
	Monthly summary	361.0	0.07	25	0.7	17.5
March	Weekdays	300.3	0.05	15	0.9	13.5
	Weekends	172.0	0.06	10	0.3	3.0
	Monthly summary	472.3	0.06	25	0.6	16.5
April	Weekdays	-	-	-	-	-
	Weekends	-	-	-	-	-
	Monthly summary	-	-	-	-	-
Season estimates		1,418.1	0.14	174	0.7	104.6

REPORT ON BLACK BEAR TAGGING PROJECT

NORTH BAY DISTRICT

by
M. E. Buss

Introduction

A pilot project was undertaken this past spring and summer to determine the feasibility of trapping and handling black bear (Ursus americanus) by the use of wolf traps or leg snares and immobility drugs. Eleven (11) bear were handled. However, not all these animals were trapped nor was the application of drugs necessary in all instances. Two (2) bear died as a result of the handling, three (3) tagged bear were recovered and six (6) tagged animals remain at large.

Methods

Briefly, the method consisted of three steps. The bear were baited to an area, trapped, immobilized and tagged. Several bear were drugged while they were free ranging.

After consultation with a local tourist outfitter and guide it was decided that a bait consisting of fresh meat scraps could be used. The scraps, approximately a bushel, were placed in a forty-five gallon oil drum and covered with water. Keeping the bait covered with water helped prolong the decomposition of the scraps. The barrel was then partially buried into the ground to prevent the bear from upsetting it. This arrangement also helped prevent the loss of bait to foxes, crows, ravens and other carrion feeders. Each bait station was established and checked until signs showed that bear were frequently using the station. Traps and/or snares were then set.

Two types of steel traps were used and an Aldrich Spring Activated Animal snare. Two sizes of wolf traps, No.4 and No.4 1/2, Oneida Newhouse were used. No problems were incurred in getting bear to step into the traps. A minimum of camouflaging was necessary to hide the traps. However, the No.4 trap would not catch and hold the bear as did the No. 4 1/2. This, we believe, was due to the smaller trap (6 1/2" spread) throwing the paw out of the set while the No.4 1/2 (7 3/4" spread) caught the paw higher up. The traps were attached to heavy log drags which tangled in the brush when the bear tried to escape. We were not able to catch bear in the leg snares after repeated sets.

Several bear were shot without being restrained beforehand. These bear were encountered in a variety of situations. The animals were stalked or pursued until they were "cornered" and then shot with the immobilizing drug as were the trapped bear.

The immobilizing drugs were administered by either the CO_2 operated or a long range powder charged Cap-chur gun. To immobilize animals caught in traps, Succinylcholine Chloride (20 mg. solution) was administered at a dosage of 1 cc/100 lbs. of body weight. Free ranging animals were given 2 cc/100 lbs.

If the animals were to be moved a follow-up injection of Diabutal (pentobarbital sodium) was given. A dosage of 1 cc/5 lbs. body weight up to 100 lbs. and 1 cc/10 lbs. for every 10 lbs. over 100 lbs. body weight was given interperitoneally. The bear were ear tagged, sexed and measured if circumstances allowed.

Results

Table 1 shows the results of our tagging operations.

Discussion

Baiting wild bear appears to be no problem but it requires a considerable amount of checking and freshening of the bait stations.

The use of No.4 1/2 Oneida Newhouse traps was satisfactory even though our experiences were limited. Here again the traps must be watched closely while they are set to minimize the possibility of injury to the animal and/or loss of the trap. During our investigation no steel traps were set without an observer in the area. There were no visible injuries to the animals caught.

Both the Succinylcholine Chloride and the Diabutal provided the desired immobilizing and anesthetizing effects. Further experience with Diabutal on adult bear will help refine the dosage. Smaller bear are easily anesthetized with injections of the drug. Larger bear seem to metabolize the drug faster and the desired effect depends on an accurate dosage of the first injection.

Nine attempts were made to immobilize free ranging bear but only two attempts were successful. In four instances bear were hit with the dart but escaped into the bush. The animals recovered before they could be found and further anesthetized. In most cases the darts were lost. Due to this loss of equipment and possible danger in handling partially immobilized animals we do not intend to shoot free ranging animals.

TABLE 1

Black Bear Tagging Record 1960

Tag Number	Sex	Age	Date Tagged & Handled	Manner Captured	Date Recovered	Manner Recovered	No. of Days Bet. Release & Recovery	Airline Distance Moved (Miles)
1-2	M	Cub	11-5-60	hand caught	-	-	-	-
3-4	F	Cub	28-5-60	hand caught	-	-	-	-
5-6	M	Cub	25-6-60	hand caught	30-8-60	road kill	66	10 1/2
7-8	F	Cub	26-6-60	hand caught	30-6-60	recaptured & sent to Algonquin Park	5	6
9-10	F	Yearling	26-6-60	steel trap & drugs	-	-	-	-
11-12	M	Adult	27-6-60	drugs only	18-7-60	shot	16	killed at same location
13-14	M	Adult	16-7-60	steel trap & drugs	-	-	-	-
-	M	Yearling	16-7-60	drugs only	-	overdose of drugs & internal injuries	-	-
-	M	Cub	17-8-60	drugs only	-	internal injuries	-	-
15-16	M	Cub	21-8-60	drugs only	-	-	-	-
17-18	F	Cub	27-8-60	drugs only	-	-	-	-

We plan to expand our efforts for the coming year and have set a goal to trap and tag twenty-five (25) bear. Additional traps and Capchur gun equipment have been budgeted for as well as a full time student since we feel the project requires a sustained and intensive effort if a quantity of bear are to be handled. Assistance will be given by area Conservation Officers and the project will be directed by the District Biologist.

ONTARIO WOODCOCK SINGING GROUND SURVEY - 1968

by
J.B. Dawson

ABSTRACT

To obtain data relating to the breeding population of American woodcock, District Fish and Wildlife staffs participated in a spring survey of woodcock singing grounds using randomly selected routes in southern Ontario in 1968. The survey was coordinated by the U.S. Fish and Wildlife Service. Results of eighty-one routes are listed. The average number of woodcock heard per route was 3.91; this compares to a continental weighted average of 3.82 obtained from 920 survey routes in eastern states and provinces. In northern Ontario, district staff ran 24 singing ground transects through selected habitat. An average of 1.[illegible] woodcock was heard per [illegible] route; 13 routes were unproductive. Both types of survey will be continued in 1969.

Introduction

The American woodcock is becoming increasingly important as a game bird. Long the favourite of a small but dedicated core of hunters, the challenge of "timber-doodling" is being discovered by more and more sportsmen each year.

To effectively manage woodcock the status of the population and recent trends must be known. For some years now, a wing collection survey organized by the U.S. Fish and Wildlife Service and coordinated in Canada by the Canadian Wildlife Service, has furnished data on changes in the geographic distribution and relative size of the harvest. A singing ground survey to provide an index to the breeding populations of woodcock, has been conducted in many states and provinces, but has not had the benefit of coordination by a central agency. To obtain comparable results all across the breeding grounds, the U.S. Fish and Wildlife Service is coordinating a completely random singing ground survey. Ontario participated in this survey for the first time in 1968. Prior to 1968 a few districts ran census routes, but no provincially coordinated survey had been undertaken for over ten years.

To obtain better information on the status of woodcock, two types of survey were run in Ontario in spring 1968; one was a random singing ground survey across southern Ontario; the other was a non-random survey in northern Ontario where very little was known concerning the distribution and abundance of woodcock. The random and non-random surveys

are described in sections A and B respectively which follow..

A. COORDINATED RANDOM SINGING GROUND SURVEY

Methods

The random survey was restricted to the area lying south of the northern boundary of site region 5E (Hills, 1961), running through the forest districts of Sault Ste. Marie, Sudbury and North Bay (see figure 1). Choice of this area was based upon prior knowledge regarding good breeding populations of woodcock, and the lack of road access further north which would have limited the use of randomly selected census areas.

Selection of random routes followed procedure set out by the U.S. Fish and Wildlife Service.

Randomization was accomplished as follows:

a) southern Ontario was marked off into ten-minute by ten-minute blocks of latitude and longitude; 197 blocks were outlined on maps, scale 1:500,000.
b) From a table of random numbers, 105 blocks were selected. Based upon considerations of available manpower, it was planned to select 125 blocks. However, the selection of one block automatically disqualified the selection of the 8 adjacent blocks; and following the selection of 105 blocks, very few "qualified" blocks remained and these could only be chosen with difficulty via the table of random numbers.

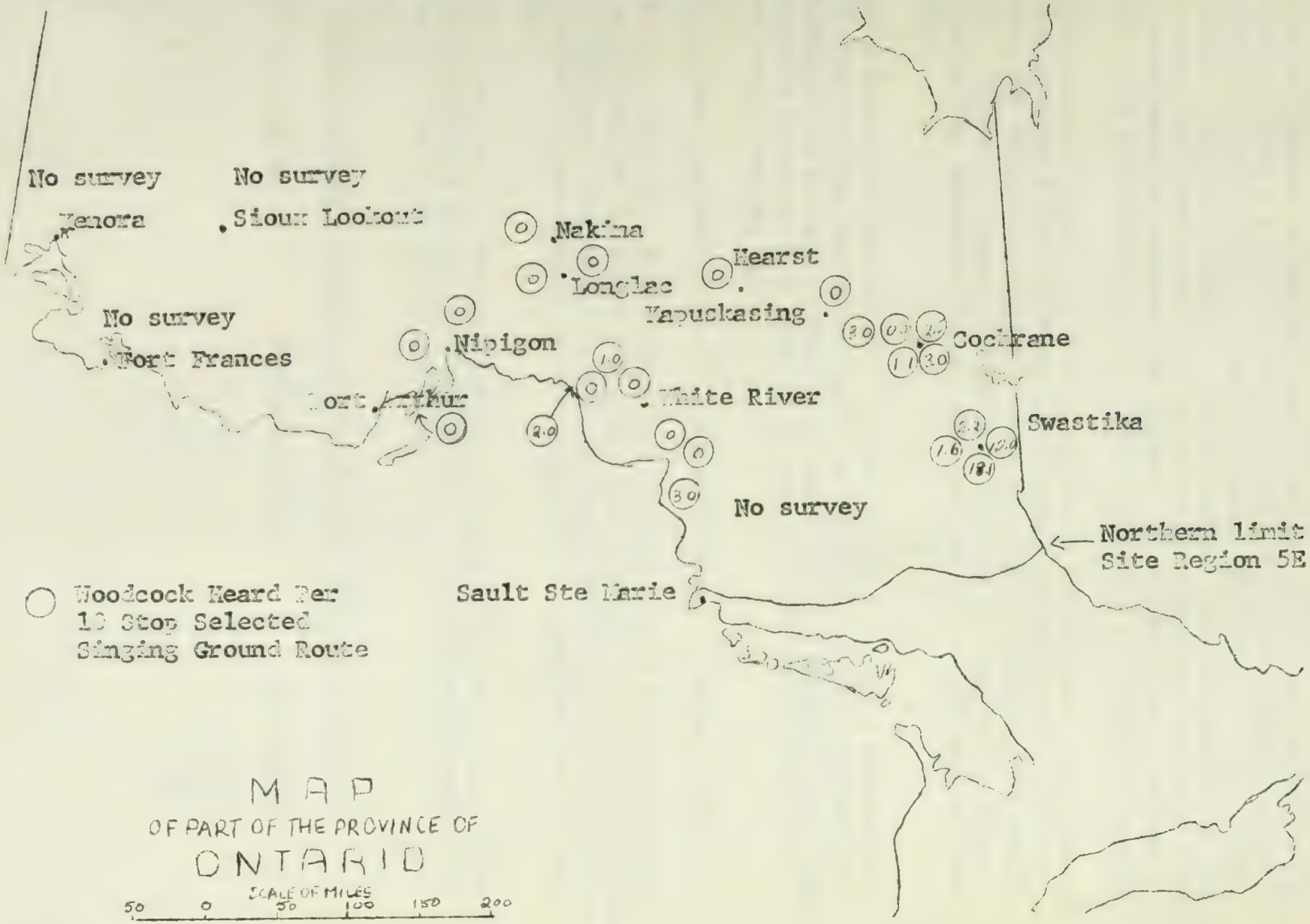
Selected blocks were renumbered consecutively and outlined on maps; these were forwarded to the districts concerned, along with instructions for locating the 3.6 mile-long survey route and for conducting the actual census. See appendices 1 and 2.

Taped woodcock calls were obtained from the U.S. Fish and Wildlife Service, re-taped and distributed to all twenty-two forest districts.

Results

Districts submitted results of the survey in duplicate to Game Management Subsection. One copy of each was forwarded to Mr. Eldon Clark, Research Biologist, Section of Migratory Upland Game Bird Studies, U.S. Bureau of Sports Fisheries and Wildlife, U.S. Department of the Interior, Calais, Maine, who was responsible for collating data obtained from the survey.

Figure 3 Non-Random Woodcock Survey 1960



Details of the 88 routes run are listed in Apendix 3. Results of the coordinated survey in eastern North America are shown in Table 1A&B which was taken from a U.S. Fish and Wildlife Service Administrative Report entitled "The Status of American Woodcock, 1960" by E.R. Clark and W.E. Goudy. So that Ontario's 1960 results can be compared to those in other states and provinces, the Ontario route average has been added. (Because there were no comparative figures for Ontario for previous years, Ontario's average was not included in Clark and Goudy's report.)

Clark and Goudy (op. cit.) used only those routes for which five or more of the ten stops were acceptable in their calculations. Noise interference and time limitations made some stops unusable (see remarks Apendix 3). Of the 105 possible routes, 13 were not run for various reasons, including inaccessibility, and the results of six others could not be used.

Figure 2 shows the results of 71 routes with 5 or more acceptable stops. So that routes can be compared on an equal basis, circled figures represent the number of woodcock heard, on the basis of ten stops. For instance, a route with 5 acceptable stops, where two birds were heard, has been given an index of 4.0.

Table 2 shows the results of the random survey by Forest District.

Clark and Goudy (op. cit.) point out that there is a rapid conversion to random routes in eastern states and provinces "of the 920 routes conducted this year 777, or 84%, were randomly selected. We anticipate that the number of comparable routes available for analysis will sharply increase."

A slight decline in woodcock heard per comparable route was observed in 1960, particularly in the Eastern Region. The following summary is taken from the Clark and Goudy report.

Table 3:

ANNUAL CHANGES IN WOODCOCK POPULATION INDICES, 1965-1960

Year	Eastern Region	Western Region	Continental
1965	- 8.4%	- 11.1%	- 6.5%
1966	+ 2.4%	- 0.5%	+ 1.7%
1967	+ 1.5%	- 3.5%	0.0%
1960	- 8.4%	- 4.5%	- 6.9%

Table 14. Woodcock Breeding Population Indexes as Indicated by Singing-Ground Surveys in 1967 and 1968 (from Clark and Goudy 1968)

State or Province	Total number of routes conducted 1967	1968	Number of Comparable routes	Woodcock heard per comparable route 1967	1968	% change in woodcock heard /route from 1967
EASTERN REGION						
Connecticut	12	12	10	2.50	3.10	
Delaware 1/	3	3	1	1.00	0.00	
Maine 2/	40	00	19	11.37	0.00	
Maryland 1/	15	23	7	1.14	1.57	
Massachusetts	4	8	3	0.67	5.67	
New Brunswick	7	10	4	13.25	11.00	
New Hampshire	12	12	9	6.44	7.22	
New Jersey 2/	5	10	0	--	--	
New York 2/	24	24	0	--	--	
North Carolina 2/	0	50	0	--	--	
Nova Scotia 2/	17	24	0	--	--	
Pennsylvania 1/	66	73	54	1.48	1.20	
Prince Edward Island	3	3	1	2.00	1.00	
Vermont	3	5	3	13.33	8.33	
Regional Totals & Weighted avgs. 3/	211	483	111	4.71	4.37	- 8.36

1/ Randomly selected routes conducted during the past 2 years
2/ In the process of changing to randomly selected routes in 1968
3/ Weighted indexes are obtained by multiplying woodcock heard per comparable route with a factor based on land area represented by at least 10 routes or where one comparable route represented not more than 2,100 square miles.

Table 13 Woodcock Breeding Population Indexes as Indicated by Singing-Ground Surveys in 1967 and 1968 (from Clark & Goudy 1968)

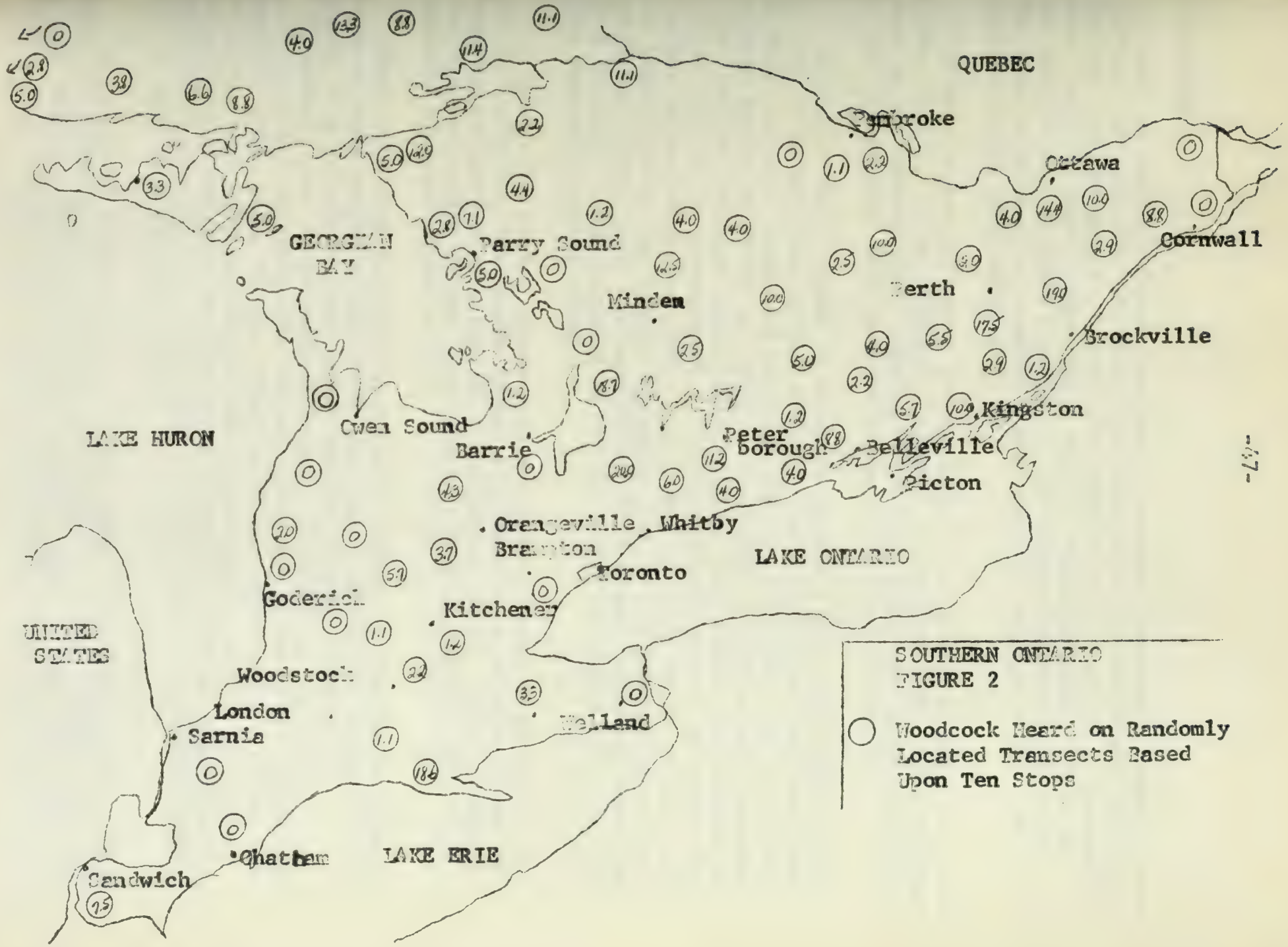
State or Province	Total number of routes conducted 1967	1968	Number of comparable routes	Woodcock heard per comparable route 1967	1968	% change in woodcock heard /route from 1967
WESTERN REGION						
Illinois	4	4	1	2.00	2.00	
Indiana 2/	8	64	2	9.50	6.50	
Iowa	13	12	8	2.13	1.25	
Michigan 1/	130	133	87	4.53	4.25	
Minnesota	11	17	6	4.66	6.50	
Ohio	12	11	7	5.43	5.00	
Ontario 2/	4	88	0	--	--	(3.91)*
West Virginia 1/	45	54	34	0.53	0.76	
Wisconsin 2/	16	104	6	4.50	3.83	
REGIONAL TOTALS & WEIGHTED AVGS. 3/	243	487	151	3.31	3.16	-4.46
CONTINENTAL TOTALS & WEIGHTED AVGS.3/	454	920	262	4.11	3.82	-6.93

1/ Randomly selected routes conducted during the past 2 years.
2/ In the process of changing to randomly selected routes in 1968
3/ Weighted indexes are obtained by multiplying woodcock heard per comparable route with a factor based on land area represented by at least 10 routes or where one comparable route represented not more than 2,100 square miles.

(3.91)* not included in table prepared by Clark and Goudy. Inserted for comparison purposes by the author.

TABLE 2 RESULTS OF 19[illegible] RANDOM WOODCOCK SINGING GROUND COUNTS BY FOREST DISTRICT

District	Routes Assigned	Usable Routes	Total Stops	No. of Birds	Stops/ Bird	Woodcock/ Route	No. Non-Productive Routes	Woodcock/ Productive Route
LAKE ERIE	14	[illegible]	65	23	2.71	2.9	4	5.7
LAKE HURON	14	[illegible]	73	10	7.30	1.1	4	2.0
LAKE SIMCOE	7	7	53	[illegible]	1.40	5.4	2	7.6
LINDSAY	9	7	52	32	1.62	4.6	0	4.6
MEEED	11	11	84	49	1.71	4.4	1	4.9
KEMPTVILLE	12	11	80	67	1.31	6.1	2	7.4
PEMBROKE	6	5	46	[illegible]	5.70	1.6	1	2.0
PARRY SOUND	10	[illegible]	64	27	2.39	3.0	2	3.8
NORTH BAY	5	4	34	[illegible]	.05	9.0	[illegible]	9.0
SUDBURY	11	[illegible]	51	[illegible]	1.54	5.5	0	5.5
SAULT STE MARIE	6	4	28	9	3.11	2.2	1	3.0
TOTAL OR AVERAGE	105	[illegible]	638	332	1.9	3.9	17	5.2



SOUTHERN ONTARIO
FIGURE 2

○ Woodcock Heard on Randomly Located Transects Based Upon Ten Stops

Discussion

Much of southern Ontario evidently supports reasonable breeding populations of woodcock. Of the 31 randomly selected routes run only 17 fell on "barren ground". Ontario's average of 3.91 compares favourably with Clark and Goudy's (op. cit.) western region average of 3.16 and the continental weighted average of 3.82 birds per comparable route. The Ontario average is somewhat lower than the average of 4.37 for the eastern region (see table 1.).

If non-productive routes are excluded, the Ontario average per route climbs to 5.2. It is difficult however, to compare data collected this year across eastern North America since many areas are in varying stages of the change-over from selected to randomly located routes.

Eight of the 17 routes on which no woodcock were heard were located in Lake Huron and Lake Erie Districts. Lake Huron District, portions of which support excellent woodcock hunting in autumn, had the lowest average number of birds per route. It should be pointed out, however, that district averages mean little; samples were small, and chances of routes falling in non-woodcock habitat were much greater in areas supporting intensive agriculture. This point is illustrated by six singing ground routes run through selected habitat by Kespeler District staff in spring, 1968; the mean number of woodcock heard per route was 29.1 (Mansell, 1968) compared to the 1.1 birds per route heard on the nine randomly located routes.

Although the random census does not produce results which are useful to districts, the random survey will provide a suitable index to breeding woodcock populations on a Provincial basis. It is expected that non-productive routes (zero counts) will be replaced with other, randomly selected plots in 1969.

There were some problems encountered during the survey, and the results of some routes could not be used for a variety of reasons. E. Clark, in a letter to Game Management Sub-section, stated:
"In general, your cooperators did a real fine job on the survey. As with all other Provinces and States, there are a few points which you probably could bring to the attention of the cooperators. First, you will note that very few routes show 10 acceptable stops. In a great majority of cases this was the normal result of hearing interference reported by the observer. However, in some cases I discounted stops due to time or a similar case....

In regard to starting time - there were a few cases where I questioned the starting time as being too early; this was largely from comparing starting time with official sunset time. I know the latter can vary 5 to 10 minutes from actual local sunset, depending on the location

of the source, so I cannot definitely say the start was too early; but in some cases the variance was enought that I cut off one or two stops at the beginning of the route. Also, when time elapsed was somewhat more than 30 minutes, I cut off one or more stops at the end. In the few cases where less than five acceptable stops remained, the route was not counted; this has been our procedure in comparing years."

B. NON RANDOM SINGING GROUND COUNTS - NORTHERN ONTARIO

Introduction

Few woodcock breeding records are available for northern Ontario. Woodcock are present in good numbers in fall in some northern areas, notably the Little Claybelt in Swastika and Cochrane Districts. Nest and flightless young records and summer records listed in the Royal Ontario Museum of Zoology files are shown in Figure 3. Since better records of the distribution and abundance of breeding woodcock in northern Ontario are needed, all northern districts were requested to run singing ground routes in selected habitat.

Methods

The method of census was the same as in the random survey. Only the manner in which routes were selected differed. Observers were requested to choose likely-looking habitat in which to run census routes. Instructions respecting these non-random routes are outlined in Appendix 4.

Results

Figure 3 shows the number of woodcock heard on 24 non-random routes. Table 4 shows the results of the 24 non-random survey routes.

Few woodcock were heard in northern Ontario, with the notable exception of Swastika and Cochrane Districts. There has been a question as to whether autumn birds were of local origin or whether there was a northern movement of birds produced to the south. The singing ground survey indicates that a good proportion of the fall population probably is produced.

Although no birds were heard in Geraldton, Port Arthur or Kapuskasing districts, many observers were not familiar with woodcock, and had little opportunity to observe or hear spring courtship behaviour. Also, low breeding densities make it more difficult to locate birds, and easier to miss the few which might be present. Bob Catton of Kapuskasing comments "Although not surprised at the results, nevertheless, we do believe birds nest in the district, albeit, in small numbers...". T.D. Anderson of Nakina conducted a route on the Wababimaga Road and although no woodcock were heard, he stated "a couple of woodcock have

Figure 3 -50-

Northern Ontario Breeding Distribution of American Woodcock from Royal Ontario Museum of Zoology Records

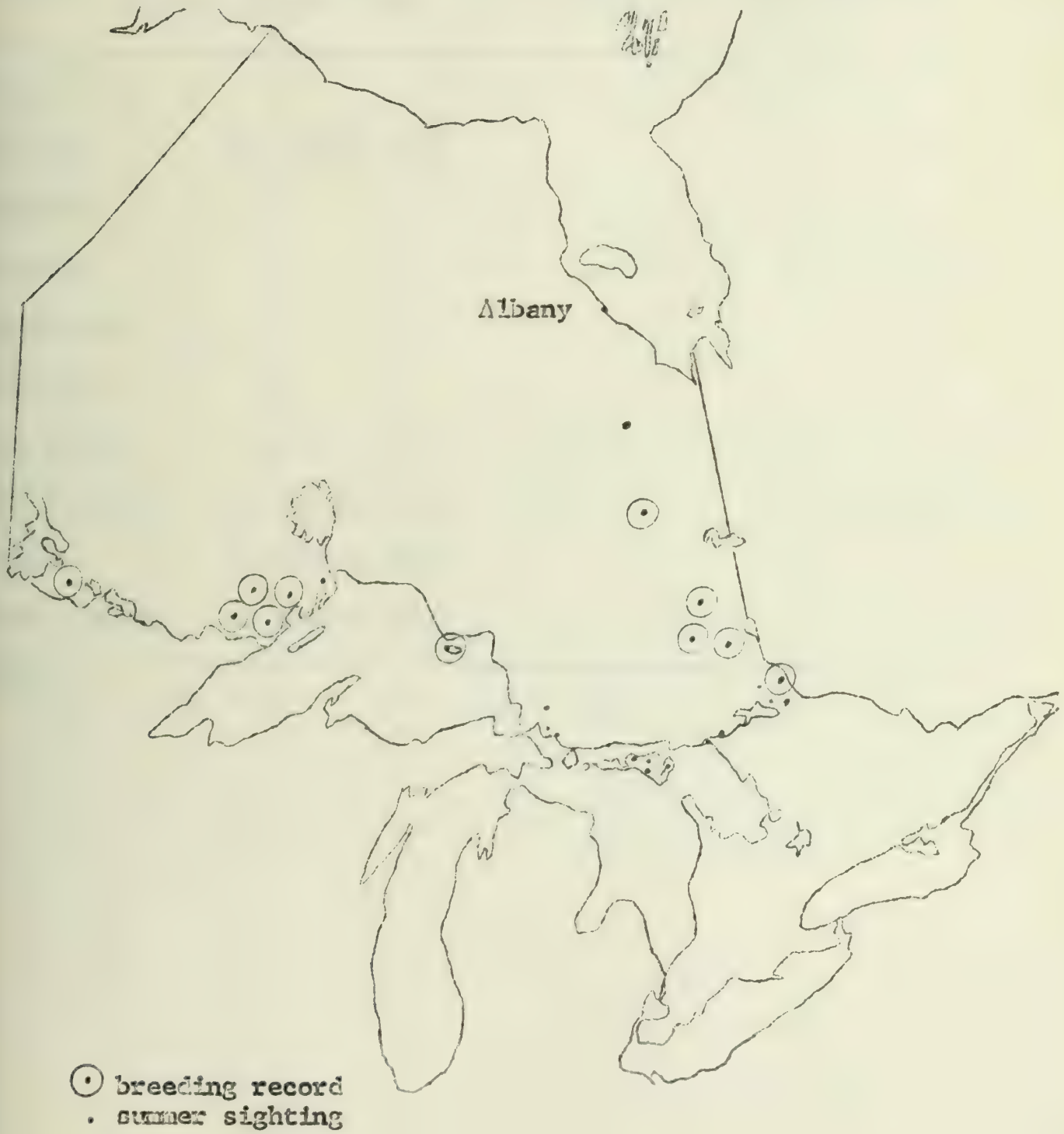


TABLE 4

RESULTS OF 1968 NON-RANDOM WOODCOCK SINGING GROUND COUNTS BY FOREST DISTRICT

DISTRICT	NO. ROUTES	NO. STOPS	NO. BIRDS	STOPS/ BIRD	WOODCOCK/ ROUTE	NON-PRODUCTIVE ROUTES
White River	5	50	3	16.6	.6	3
Chapleau	NO SURVEY DONE					
Swastika	4	35	33	1.1	8.7	0
Cochrane	6	47	9	5.2	1.5	1
Kapuskasing	2	20	0	-	0	2
Geraldton	4	40	0	-	0	4
Port Arthur	3	30	0	-	0	3
Fort Frances	NO SURVEY DONE					
Kenora	NO SURVEY DONE					
Sioux Lookout	NO SURVEY DONE					
TOTAL or AVERAGE	24	222	45	4.9	1.9	13

been sighted in this area, but I have not seen any myself."

In White River, some good additional information on breeding woodcock was obtained. The Royal Ontario Museum have only one breeding record in White River Forest District, -on Michipicoten Island, (see fig. 2). Tom Harrison of White River reports that "one pair of woodcocks nested within the town limits of White River in 1967 and 1968."

Swastika also reports the following information on woodcock.

Date	Township	No. of Broods	Nest	Remarks
June 24/63	Robillard	1		
June 30/63	Tyrrell	1		
May /63	Truax		6 (4 eggs each)	Discovered by tree planters in area of 4 acres. (All hatched)
July /64	Grenfell	2		
May 4/66	Henwood		1 (4 eggs)	
May 13/68	Beauchamp	1		

Although Port Arthur transects were unproductive, Messrs. M. Cobus and B. Thacker heard two males and saw one near their survey area in Sibley Provincial Park. Another specimen was collected near Shebandowan Lake in the spring of 1968 (Ryder, 1968). R.O.M. files show 4 breeding records in the Port Arthur-Fort William area (Figure 3.)

Breeding records (nests or flightless young) which extend the known breeding range of the woodcock should be forwarded to the Royal Ontario Museum, with copies to Game Management Sub-section, Maple.

The R.O.M. has only one breeding record for woodcock west of Port Arthur; no summer sightings are on file. It is hoped that western region districts will conduct as many singing ground routes as possible during the spring of 1969. It is possible that portions of Fort Frances, Kenora and perhaps Sioux Lookout Districts support more breeding woodcock than we realize.

REFERENCES

Clark, E.R. and W.E. Goudy, 1960. The Status of American Woodcock, 1960, U.S. F & W Serv. Admin. Bull. 9pp.

Hills, A. 1961. The Ecological Basis for Land-Use Planning. Res. Rept. No.46. Ont. Dept. Lands and Forests

Mansell, D. 1960. Spring Surveys Woodcock, Hespeler District. Unpublished report. 3pp.

Ryder, R.A. 1960. Pers. Com.

WHEN REPLYING KINDLY QUOTE
THIS FILE NUMBER
GM 9-0-3

March 26, 1968

ONTARIO

DEPARTMENT OF LANDS AND FORESTS

MEMORANDUM TO: All districts

FROM: Fish and Wildlife Branch

RE: ONTARIO WOODCOCK INVENTORY

The woodcock is becoming increasingly important as a game bird. Little research or management of this exceptionally sporty species has been conducted in Ontario. Although many gunners know covers which provide good hunting in fall, we do not have reliable data on woodcock breeding densities or distribution.

Ontario is cooperating with the U.S. Bureau of Sports Fisheries and Wildlife in a randomized survey of singing male woodcock this year. This survey is designed to provide an index to the size of the breeding population and, also, should provide some very worthwhile information on the distribution of woodcock breeding in Ontario.

One hundred and five ten-minute blocks were selected, using a table of random numbers from the area south of the northern most limit of Mr. Angus Hills' site region 5E, which runs just north of Sault Ste. Marie, Sudbury and North Bay.

Singing ground transects should be run in each block, where road access permits. There are several randomly-selected blocks in the sample which may not have road access; these blocks should be disregarded. The procedure in running inventory transects is carefully described in the instruction forms, a sufficient number of which are enclosed. The survey is designed to fit a concession-type of road network. This is adequate for southern Ontario but may not be applicable to more northerly locations.

The following procedure should be used in locating survey routes within the selected blocks.

1. One route, 3.6 miles long is placed within each block; 10 stops are located at 0.4 mile intervals.

2. A large-scale map showing passable roads during the time-period for conducting routes within your zone should be obtained.

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DEPARTMENT OF LANDS AND FORESTS

3. The geographic centre of each block is determined.

4. The crossroad nearest centre of the block becomes the beginning point of the route, providing it contains an all-weather road that is not a major highway along which traffic interference would be excessive. If the nearest crossroad cannot be used as the beginning point of the route, the second nearest is used.

5. The primary and secondary directions of the route are determined from the attached table of random directions.

   a. This table lists the directions to be followed for each route, with the table repeating for routes 51-100, etc.
      (i) For example, the directions to be followed for route number 63 would be the same as for route number 13.

   b. When possible, the route first proceeds in the direction of the first letter and at the first intersection shifts in the direction of the second letter, then to the primary letter, etc., alternately.
      (i) For example, route number 13 would begin in a westerly direction, then at the first intersection shift southerly, at the second intersection westerly, etc.

      (ii) In the event the route cannot proceed as indicated, the direction should be reversed; i.e. west (primary) and south (secondary). If this does not fit the road system, revert to the opposite original primary direction (east) as the primary direction and any intersection as the secondary direction.

6. Where road systems do not permit the above described treatment, any road within the block can be used. The starting point of the transect should be the one closest to the geographic centre of the block, and should be randomly selected. It is important that no physiographic feature be used; we suggest that a mileage from a certain point, which could be the border of the 10-minute block, be used to determine the starting point of the transect.

7. Maps showing location of routes should be provided to cooperators by the district office.

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DEPARTMENT OF LANDS AND FORESTS

8. Three copies of the map showing the individual transect should be made, one for the cooperator, one for the district office and one for Game Management Section at Maple. The route number assigned should be noted on each map and survey form.

9. Instructions on running routes are described in the survey instruction form. Survey dates for your area are shown on the map.

10. Some potential cooperators may not be familiar with singing woodcock. It may be desirable for an experienced observer to accompany these men on a familiarization run prior to the inventory, or help in the actual survey.

Currently we are attempting to obtain either tapes or records of woodcock and we hope to have these available before the survey commences. Maps and a list of block numbers applying to your district are appended.

Your cooperation in this survey will be most appreciated.

JBD/jkh
attach.

C.H.D. Clarke, Chief,
Fish & Wildlife Branch

Instructions for Conducting Woodcock Singing-ground Random Survey Routes

Introduction

The purpose of this survey is to obtain an index to the size of the woodcock breeding population in North America. The technique described here is a count of male woodcock heard on singing-grounds along randomly selected routes throughout the species' breeding range.

As part of their spring courtship behavior, male woodcock exhibit aerial and vocal displays each morning and evening. Since their behavior is most consistent during the evening, this period is used for survey purposes. Woodcock males usually begin their activities each evening by giving a call described as a "peent" from their diurnal coverts. They then walk or fly to an opening called a "singing-ground." From the singing-ground, birds alternately "peent" and make "flight songs." If possible, novice survey participants should spend time afield with an experienced observer in order to become familiar with woodcock sounds. Recordings will be made available to each newly randomized State for observers not familiar with woodcock courtship sounds.

Originally, survey routes were established in areas where woodcock were known to be present. However, studies suggest that counts along these routes may not accurately represent woodcock population densities in the various States and Provinces. Data from randomly distributed routes are a better measure of both woodcock breeding density and annual fluctuations in density. Consequently, all new woodcock routes are being selected on a random basis to obtain the highest possible degree of accuracy in estimates of population density and annual fluctuations. However, States that have not been randomized should continue to run the existing management survey routes.

Procedure

1. General: Please read and follow instructions carefully so that data from your route will be of maximum value and results will be comparable with past and/or future surveys. It is desirable that the same individual run the same routes year after year. When this is impossible, new survey participants should take special care to become familiar with the standardized method of conducting these surveys and with woodcock courtship displays. Make a trial run of your route(s) to become familiar with location of stops and road conditions. Be as precise as possible in determining "stops" (at 0.4-mile intervals) so that their locations will be identical each year. A normal characteristic of random surveys is that some routes will fall in unfavorable habitat, so do not be disheartened if you do not hear birds on your route.

2. Time of Year: See the attached map for the time span during which the survey should be conducted in your area.

3. Time of Day: Male woodcock courtship performances begin from 10 to 30 minutes after sunset, depending on light intensity. Plan to arrive at the starting point for your route shortly after the time of local official sunset. Since the amount of cloud cover affects light intensity and hence the timing of woodcock activities, begin your route 22 minutes after local official sunset if the sky is clear to 75 percent over cast, and 15 minutes after local official sunset if the sky is more than 75 percent overcast.

4. Conducting the Routes: The map you received with the survey forms and these instructions indicates the starting point (stop No.1) and direction of travel for your route. Record the time you begin listening at the first stop. Stop your vehicle's engine and step several feet away before making the count at each stop. Listen for 2 minutes and record all birds heard "peenting." Then proceed rapidly 0.4 mile to the next stop and again record the number of birds "peenting." Proceed until all 10 stops have been covered. Record the time at finish. Write "time limitation" opposite all stops not covered within 30 minutes. Please contact your local coordinator immediately if you find you will be unable to run your assigned route(s) within the specified time period or the survey route, as originally established, cannot be run because of highway construction or other factors.

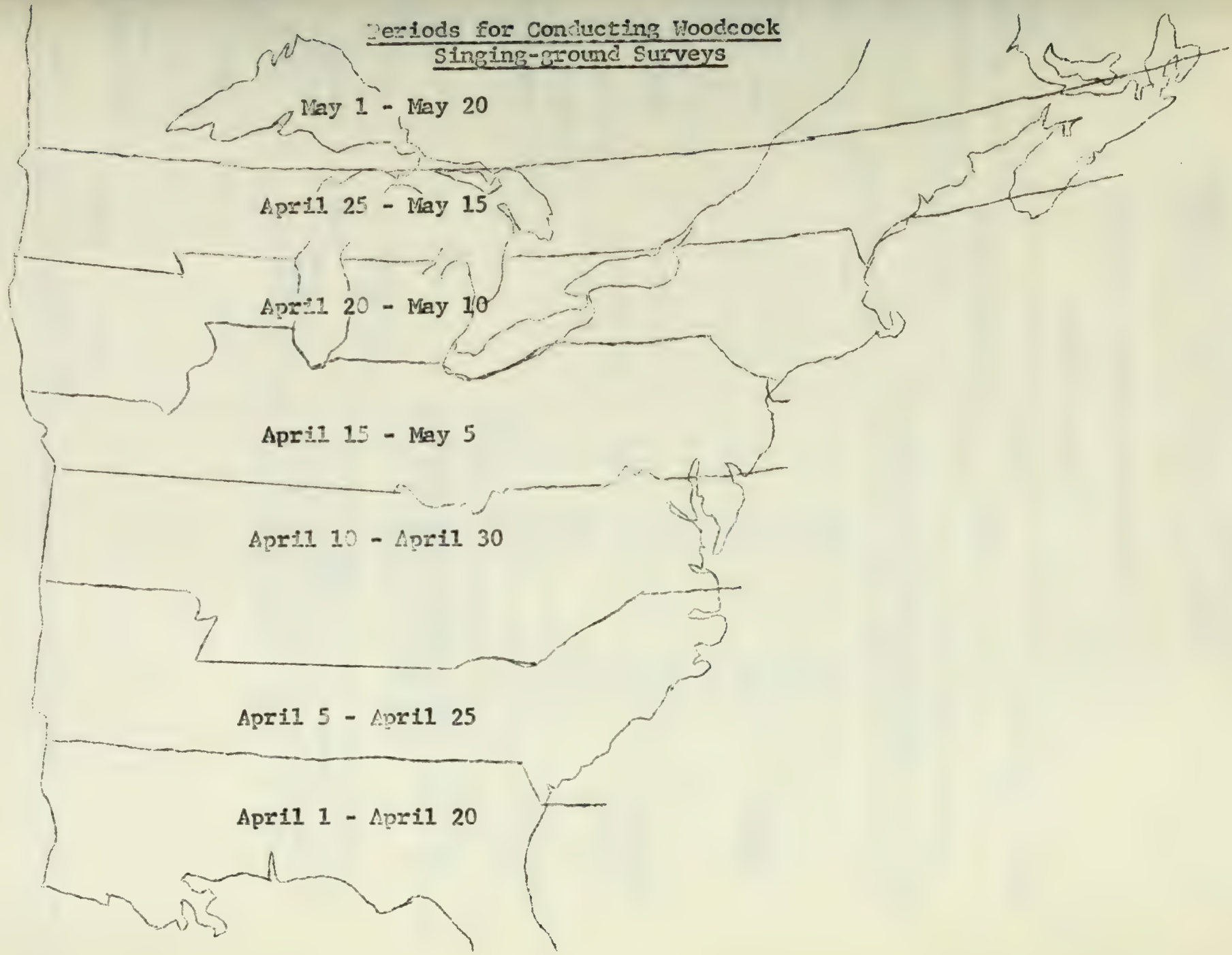
5. Recording the Counts: At each stop, record the number of different birds you hear "peenting." Do not record birds you hear performing only the flight song. When no birds are heard, record "0" in the appropriate column. Upon completion of the route, record the total number of different "peenting" birds heard.

6. Recording Other Data: It is extremely important that the form be completely filled out. To act as a guide, a sample completed form is attached.

7. Things to Avoid (IMPORTANT): Counts should not be made when the temperature is below 40°F, in heavy rain, or when the wind causes twigs and leaves to be in constant motion.

8. Number of Times to Count: Normally, conduct each route only once during the specified survey period. However, if weather or factors such as traffic, barking dogs, croaking frogs, or human disturbances cause invalid counts at five or more stops, the route should be rerun on another evening. When disturbances at a particular stop make a count invalid, note the type of disturbance and proceed to the next stop. If disturbances which necessitated rerunning of a particular route persist, it is not necessary to make a third effort.

9. Forwarding the Results: As soon as you have completed your route(s), mail ____ copies of the completed forms, including the original, to your coordinator indicated below. Complete the survey(s) and mail forms as soon as possible. Results should be received at the Bureau's Migratory Bird Populations Station no later than May 25. Make a special effort to meet this deadline; otherwise, the overall analysis will be delayed and the usefulness of your efforts will be reduced. We sincerely appreciate your participation in this project. A report of recent woodcock research and management activities (including results from this survey) will be mailed to all cooperators.


Periods for Conducting Woodcock
Singing-ground Surveys
May 1 - May 20
April 25 - May 15
April 20 - May 10
April 15 - May 5
April 10 - April 30
April 5 - April 25
April 1 - April 20

Budget Bureau No. 42-R1462
Approval Expires 3/31/72

U.S. DEPARTMENT OF THE INTERIOR
Bureau of Sport Fisheries and Wildlife
Migratory Bird Populations Station
Laurel, Maryland 20810

WOODCOCK SINGING-GROUND SURVEY

(Random Routes)

State or Province: West Virginia
County: Grant
Route No. & Name: 11
Observer's Name: Robert Kletzley
Address: Box 163 Davis, West Virginia
Date of Count: April 21, 1968
Time of "Official" Sunset: 7:02
Time at Start (First Stop): 7:24 p.m.
Time at Finish (Last Stop): 7:54 p.m.

Sky Conditions
- ☐ Clear
- ☐ Overcast
- ☒ Overcast
- ☐ Completely Overcast
- ☐ Overcast

Temperature (Deg. F.)
- ☐ 35-39
- ☒ 50-59
- ☐ 40-49
- ☐ 60+

Wind
- ☐ Calm
- ☐ Moderate (8-12 mph)
- ☐ Gentle (1-3 mph)
- ☐ Light
- ☒ (4-7 mph)
- ☐ Twigs & leaves in constant motion

Moon
- ☒ None
- ☐ 1/2
- ☐ Full
- ☐ 1/4
- ☐ 3/4

Precipitation
- ☒ None
- ☐ Mist
- ☐ Snow
- ☐ Fog
- ☐ Light rain

Stop No.	Mileage from Prev. stop	Speedometer Reading	No. of Woodcock Peenting
1	0.0	60.1	0
2	0.4	60.5	1
3	0.4	60.9	0
4	0.4	61.3	Frogs-stream
5	0.4	61.7	0
6	0.4	62.1	1
7	0.4	62.5	Highway n
8	0.4	62.9	Traffic
9	0.4	63.3	2
10	0.4	63.7	time limit
TOTALS	3.6	3.6 mi.	4

REMARKS AND OBSERVATIONS (Including changes in habitat and/or stops that may have influenced results)

4 birds heard in six stops--interference prevented listening at three stops and 30 minutes had elapsed by the time I reached the last stop.

APPENDIX 3

WOODCOCK SINGING GROUND SURVEYS

ROUTE NO.	OBSERVER	DISTRICT	1968 BIRDS / Acceptable STOP	REMARKS	ROUTE O.K.
1	E. Mantle	Sault Ste. Marie	0/5	Too long (52 min.)	*
2	NOT RUN	Sudbury			
3	M. Buss	North Bay	8/9		*
4	M. Buss	North Bay	8/7		*
5	M. Buss	North Bay	10/9		*
6	E. Mantle	Sault Ste. Marie	2/7	Too long (44 min.)	*
7	E. Mantle	"	4/8	Too long (36 min.)	*
8	E. Mantle	"	3/8	Too long (40 min.)	*
9	E. Mantle	"	0/?	Noise problems	
10	INACCESSIBLE	"			
11	G. Thompson	Sudbury	4/10		*
12	?. Gingrich	"	8/6	Too long (58 min.)	*
13	M. Buss	North Bay		Too cold (<40°)Too early Apr. 21	
14	W. Danby	Sudbury	6/9		*
15	M. Miller	"	8/9		*
16	M. Buss	North Bay	10/9		*
17	NOT RUN	Sudbury		No count-"route unsuitable	
18	M. Buss	North Bay	6/5		*
19	INACCESSIBLE	Parry Sound			
20	W. Sinclair	"	2/9		*
21	INACCESSIBLE	Sudbury			
22	W. Lawrence	"	3/9		*
23	R & W Watts	Parry Sound	3/6		*
24	NOT RUN	Sudbury			
25	M. Rusk	Parry Sound	5/7		*
26	W. Sinclair	"	4/9		*
20 Routes run			94/141		

WOODCOCK SINGING GROUND SURVEYS

ROUTE NO.	OBSERVER	DISTRICT	1963 BIRDS/ ACCEPTABLE STOP	REMARKS	ROUTE O.K.
27	G. Hamilton	Pembroke	0/10		*
28	W. Lawrence	Sudbury	4/8	Too long (42 min.)	*
28*	G. Hamilton	Pembroke	1/9	Early start?	*
29	L. O'Brien	Pembroke	2/9	Early start?	*
30	NOT RUN	Sudbury			
31	W. Watts	Parry Sound	2/7	Too long (48 min.)	*
32	S. Lorbestskie	Pembroke	1/8	Too long (42 min.)	*
33	S. Lorbestskie	"	4/10	(Also reported May 6?)	*
34	T. Regan	"		Stops not all at .4 mi.	
35	R. Ramsbottom	Kemptville	0/9		*
36	M.T. Rush	Parry Sound	5/10		*
37	B. Curtis	"	0/5	(Also reported May 10?)	*
38	G. Warner	Tweed	10/10		*
39	R. Belanger	Kemptville	4/10		*
40	R. Belanger	"	13/9		*
41	R. Easton	"	7/7		*
42	T. Corbett	Lindsay	10/8		*
43	G. Warner	Tweed	2/8		*
44	W. Bompas	Kemptville		Less than 5 acceptable stops	
45	R. Ramsbottom	"	7/8		*
46	R. Ramsbottom	"	0/6		*
47	D. Love	Parry Sound		Less than 5 acceptable stops	
8	F. Taylor	Tweed	6/6	Early start?	*
49	A. Ruxton	"	0/9		*
50	E. Johnston	Kemptville	2/7		*
51	W. Grieve	Hespeler	0/10		*

28 * two blocks were numbered 28

WOODCOCK SINGING GROUND SURVEYS

ROUTE NO.	OBSERVER	DISTRICT	1968 BIRDS/ ACCEPTABLE STOP	REMARKS	ROUTE O.K.
52	G. Carswell	Parry Sound	0/8		*
53	NOT RUN	Lindsay			
54	T. Corbett	"	2/8		*
55	J. Strachan	Kemptville	14/8		*
56	K. McLennan	"	17/9		*
57	R. Manley	Maple	1/8		*
58	N. Polmatier	"	15/8	Early start?	*
59	S. Trotter	Lindsay		Too cold	
60 A	A. Runton	Tweed	4/7		*
61	E. Shears & W. Bittle	Tweed	2/5		*
62	E. Buck	"	5/9	Early start?	*
63	NOT RUN	Lindsay			
64	C. Thompson	Kemptville	2/7		*
65	G. Harris	Hespeler	0/6		*
66	T. Ross	"			
67	H. Mulholland	Maple	0/8		*
68	J. McCullock	Lindsay	1/8		*
69	W. Bittle	Tweed	2/9		*
70	J. Miller	Kemptville	1/8		*
71	NOT RUN	Hespeler			
72	R. Morton	Maple	3/7	Early start?	*
73	M. Townes	"	16/10		*
74	A. MacFayden	Lindsay	9/8		*
75	J. Sutton & P. Hogan	Tweed	7/8		*
76	J. Sutton & P. Hogan	"	7/7		*
77	K. Henry	Hespeler	2/10		*

WOODCOCK SINGING GROUNG SURVEYS

ROUTE NO.	OBSERVER	DISTRICT	1968 BIRDS/ ACCEPTABLE STOP	REMARKS	ROUTE NO.
78	K. Henry	Hespeler	0/10		*
79	A. Fletcher	Maple	6/10		*
80	N. Harris	Lindsay	2/5		*
81	J. Sutton & P. Hogan	Tweed	4/7		*
82	R. Bellinger	Hespeler	0/5	Early start? Too long	*
83	R. Smith	"	4/7	Early start? Too long	*
84	R. Smith	"	3/8	Too long-40 min.	*
85	D. Powell	Lindsay	2/5	Early start?	*
86	D. Montgomery	Maple	0/6		*
87	R. Bellinger	Hespeler	0/5	Early start? Too long	*
88	H. Gingrich	"	1/9	(68 min)	*
89	R. Jean-Marie	"	1/8		*
90	D. Daber	"		Broken route	
91	G. Clemens	Aylmer	0/9		*
92	NOT RUN	"			
93	H. Clark	Hespeler	2/9		*
94	NOT RUN	Aylmer			
95	O. Mellick	"	0/10		*
96	E. Livermore	"		("Little too windy")	
97	NOT RUN	"			
98	NOT RUN	"			
99	J. Toll	"	3/9	(Stop #5 distance off)	*
100	J. Lawrence	"	0/5		*
101	G. Austin	"	1/9	Early start?	*
102	NOT RUN	"			

WOODCOCK SINGING GROUND SURVEYS

ROUTE NO.	OBSERVER	DISTRICT	1968 BIRDS/ ACCPETABLE STOP	REMARKS	ROUTE O.K.
103	L. Willard & L. Steward	Aylmer	13/7		*
104	Martin & Usher	"	0/3	Early start?	*
105	B. Evans	"	6/3	Early start?	*
106					
TOTALS			313/631		

SUMMARY:

83 routes run
81 routes comparable
631 stops comparable

3.91 Birds per comparable route

APPENDIX 4

WHEN REPLYING KINDLY QUOTE
THIS FILE NUMBER

GM 9-0-3

ONTARIO

DEPARTMENT OF LANDS AND FORESTS

April 24, 1968

MEMORANDUM TO:
All districts in northern Ontario including Sault Ste. Marie, Sudbury and North Bay

FROM:
Fish & Wildlife Branch

RE: WOODCOCK CALL COUNTS

The American woodcock is providing more hunting recreation each year. Considerably more study has been done on this interesting game bird in recent years, but many questions concerning the life history and habits of the "timberdoodle" are yet to be answered.

Many parts of southern Ontario have good densities of breeding woodcock, but relatively little is known about the breeding distribution of this bird in northern Ontario. Breeding records are on file from the Swastika, White River (near Franz), Nipigon-Port Arthur and Rainy River areas, but they are few in number. Good numbers of woodcock have been observed in portions of Cochrane and Swastika Districts in fall; some have been observed in Fort Frances District in autumn as well. We do not know whether these are local birds or whether they are birds which have moved north from more southerly breeding areas.

Much valuable information on the distribution and relative abundance of breeding woodcock will be obtained if members of your Fish and Wildlife staff will spend one evening this spring running a woodcock census route in likely woodcock cover. Very good coverage will result if every conservation officer were to run one transect.

General observations through the summer, particularly in the May and June calling period also may provide valuable information.

GENERAL INSTRUCTIONS

WOODCOCK SURVEY

Woodcock can be censused most easily by counting the number of males heard call along a given length of road running through territory which birds inhabit during the breeding season.

WHEN REPLYING KINDLY QUOTE
THIS FILE NUMBER

ONTARIO

DEPARTMENT OF LANDS AND FORESTS

Woodcock do have specific habitat requirements. In general, early forest succession is preferred. In southern Ontario, breeding habitat is associated with areas containing grassy or weedy openings, thickets of shrubs or small trees, and soil containing a constant supply of food (chiefly earthworms.)

Abandoned farm fields, old orchards, and recently burned over or cut over forest are also preferred. In northern Ontario, recent burns or cut-overs associated with alder runs on small streams and springs may prove attractive to breeding "cock". Courtship and mating take place in clearings lacking woody vegetation and 1/4 acre openings are frequently used. Smaller openings may be adequate if they are surrounded by low brush or shrubby growth.

As part of their spring courtship behaviour, male woodcock perform aerial and vocal displays each morning and evening. Since their behaviour is most consistent during the evening, this period is used for survey purposes. Woodcock males usually begin their activities each evening by giving a call described as a "peent" from their day time coverts. They then walk or fly to an opening called a "singing ground". From the singing-ground, birds alternately "peent" and make "flight songs".

A tape recording of woodcock "peents" has been make availalbe to all districts.

Census routes should be run through the most likely habitat, based on the description given above. A ten-stop route should be run and stops at least 0.4 miles apart made near likely looking cover.

Exact length of route will be determined by the distance that can be covered in a thirty-minute period, the approximate time in which woodcock call in the evening. It would be a good idea to make a trial run of a route to become familiar with location of stops.

Date of census- May 1st to May 20th.

ONTARIO

DEPARTMENT OF LANDS AND FORESTS

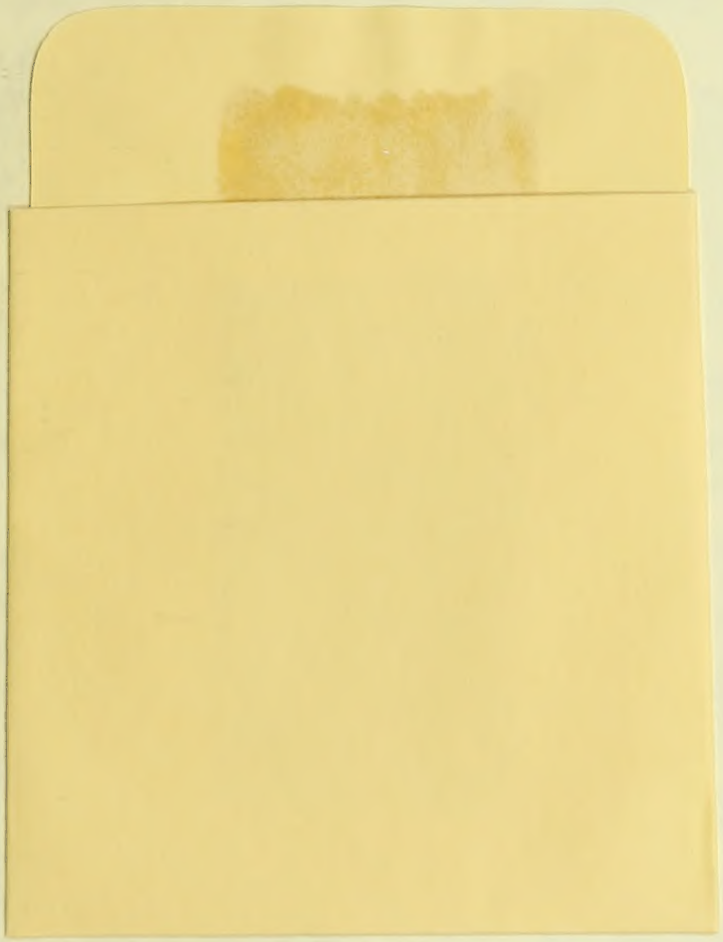
Time of census - Male Woodcock begin to "sing" at from 10 to 30 minutes after official sunset, depending on weather conditions. Period of "singing" varies from 20 to 45 minutes.

Counting - Only the "peent", a nasal "bzeep" call given on the ground, should be used for counting. Male woodcock perform a courtship flight at intervals during their calling period and a musical flight song is sung while the bird is airborne. Wait for 5 minutes after the latest expected commencement of song--listen for exactly two minutes after the first call is heard, then proceed quickly to the next two minute listening stop. A form is provided for recording the data on your route and the number of calls heard. A map should accompany your record form showing the route run and the distance between stops

Many nil reports are expected from northern Ontario, but even if your route is unproductive, you will have provided useful information.

Your help is providing more information on the status of woodcock in Ontario will be sincerely appreciated.

JBD/jkh

C.H.D. Clarke, Chief

Enclosed is a tape of woodcock "peenting", the call which is given on the ground. This should prove useful for those who are not familiar with woodcock. This recording was made very close to the calling woodcock and under normal conditions, calls are not heard so distinctly. Usually the observer does not hear the slight "hiccup" which precedes the nasal "bzeep". Please make certain the calls are played at the right speed.